Acknowledgments:

Integrity Safety Services extends its gratitude to our affiliate organizations for partnering with us to make this opportunity possible.

WSDOT

TCOC committee

Associate General Contractors of Washington

Thank You!

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2022 edition

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Flagger Introduction

Congratulations on deciding to become a certified flagger. A well trained and alert flagger is essential to providing safety in and around a construction jobsite. Your participation and understanding of the rules and codes of conduct will be an important part of making any job a success. Welcome.

Your Role

As a flagger, you will play a vital role in helping to protect the traveling public, your coworkers and road users from the dangers and hazards which are present on road construction projects. Your job is crucial to the safety of everyone involved in the project both directly or indirectly.

Your Responsibility

Most road and highway construction and maintenance jobs are performed while traffic is active and allowed to pass through the work zone. Shutting down roads or sidewalks is not always possible. Since heavy equipment, road obstacles, unfinished or rough pavement and other hazards may exist, it is necessary to lend assistance. These hazards present real dangers to the traveling public passing through the area and have the potential to cause unnecessary harm to the crew working on or near the roadway. It is the flagger's responsibility to ensure traffic moves safely and efficiently through a construction site. In order to do this job efficiently and well, you must be well trained and that is where this course will become invaluable.

Student Materials

This student handbook will help you learn more about the job of a flagger. During this course you will learn your role and how to effectively perform your assigned duties. In addition, you will learn the different traffic control set ups, zones, and devices needed to perform your duties. In addition, you will have a clear understanding of what traffic controls are needed. Typically, this will be coved at each jobsite in a meeting called a "Tool Box Talk" or Job Hazard Analysis (JHA). It is very important you read and understand this material and take an active part in the classroom activities.

Testing Your Knowledge

Once you have completed this course, you will be given a proficiency test to measure your knowledge and understanding of the materials delivered by your instructor. After you have passed the course with a minimum passing grade of 80% on the test, you will be given a laminated card which will need to be with you whenever you are actively flagging. This course is only the beginning. Our hope is you will continue to learn and develop as a proficient flagger and even help others to become successful.

Flagger Card will have the following: *1.) Date training was completed, 2.) Instructors name, 3.) Name of issuing state, 4.) Expiration date, and 5.) A statement reading "valid with photo id."*

CHAPTER 1

1.0 Introduction to Federal and State Rules

Flaggers are needed when an area of a road is temporarily changed due to a work zone, incident or planned activity and channelizing devices alone are not enough. Hazards may arise whenever a traffic lane is going to be blocked, a sidewalk is closed down, whenever an area is congested, construction equipment is going to be moved in or out of the area, and for many other reasons. Thus, flaggers are used to keep traffic moving smoothly, safely and to provide safety for all roar users as well as workers.

Ideally flaggers are the last choice in the hierarchy of controls, but sometimes a well-trained flagger is the only way to effectively control traffic in a traffic control zone.

As a flagger, you may be working for a construction company, flagging company, utility department or state agency. The job may be permanent, or you might be hired on for the duration of the project. All of these various jobs will require a standard of professionalism from flaggers. The requirements, duties and responsibilities in working for these various organizations will usually be the same. Therefore, the material you read in this manual will be applicable to any flagger job you possess. However, since this course has been written to include Washington specific rules, you will see references to both the Manual on Uniform Traffic Control Devices (MUTCD) and Washington State specific rules. This course covers section VI of the MUTCD manual.

1.1 Federal Guidelines

The MUTCD is a publication of the United States Department of Transportation - Federal Highway Administration. Part VI of this manual is the standard for traffic controls on public roads of every class or agency which are under construction or receiving maintenance.

Within the MUTCD are outlines for flagger responsibilities and methods of operations. Flaggers have been given the responsibility for public safety where one-lane, two-way temporary traffic control (TTC) revisions need to be implemented, or wherever else it is necessary to safely control roadway conditions. Public safety includes the protection of road users, pedestrians and workers in the work zone.

*The following definition are given to understand the **level of compliance**:*

STANDARD **"SHALL" = REQUIRED**

GUIDE **"SHOULD" = HIGHLY RECOMMENDED, BUT NOT MANDATORY**

OPTION **"MAY" = APPLICATION OPTIONAL**

1.2 State and Local Modifications

Individual states, counties and cities have implemented modifications to the Part VI of the MUTCD which are as restrictive, or more restrictive, in the interest of safety and good traffic control. It is

important to familiarize yourself with any changes or modifications that states, or counties may have made.

Under no circumstances can a company or training organization make changes, it must be a governing agency. MUTCD amendments must be approved by the Federal Department of Transportation, even for a state or city. Washington State flagger standards can be found in the following documents:

- *Washington Administrative Code (WAC) Chapter WAC 296-155-305 - see Appendix 1*
- *WAC 468-95: Washington State Modifications to the MUTCD*
- *WSDOT M41-10: Standards Specification for Construction*

1.3 Flagger Certification

This certification course was developed by Integrity Safety Services in cooperation with the Associated General Contractors of Washington (AGC) and in conjunction with federal and state guidelines. These training materials were reviewed and approved by the Washington State Traffic Control Oversight Committee (TCOC) and Integrity Safety Services is committed to providing excellent service, materials and training to the construction community. Through a reciprocity agreement, flaggers certified through this course are able to perform flagger duties in ***Washington, Oregon, Idaho and Montana****. A flagger certification shall be valid three years from the date of certification.*

CHAPTER 2

2.0 Flagger Qualifications, Responsibilities, and Ensuring Safety

If you are not able to protect yourself then your co-workers may be in danger as well. Your co-workers are counting on you to give them adequate warning of an approaching errant vehicle. In order to do this, you must be alert and give your full attention to your duties.

You must be able to perform your job in such a manner as to keep yourself and your co-workers safe in order that everyone may perform their job without interruption and with minimal danger. Jobsite orientation is one of the first steps in making sure you understand what hazards may exist at each jobsite. Your employer should perform this, but if they do not, you should bring it to your supervisor's attention for your own personal safety and the safety of others.

As an additional measure of ensuring the safety of all, you may need to stop and hold traffic until it is safe to pass, or slow traffic down and alert the drivers to the dangers ahead. Remember, it is your responsibility to control the flow of traffic to protect workers, road users and pedestrians.

It is also important to be aware of potential hazards such as having your back to traffic or standing in front of or behind vehicles. Hazards while flagging involve struck by and caught in-between. Some construction vehicles need very wide turns and have poor visibility. Never assume traffic (road or construction) can see you. High visibility PPE is not a substitute for situational awareness.

2.1 Qualifications

The flagger is usually the first person a road user interacts with. It is important for the flagger to be able to interact with the public in a professional manner. If a road user is upset, the flagger must not rise to the same level as the road user. Your goal is to diffuse the situation as quickly as possible. Sometimes this may not happen. Always give commands in a clear, direct and firm manner. Think of a police officer pulling you over for a traffic infraction, "Hello, license and registration please." Just remember when you are interacting with the public, you have to interact with a level of professionalism.

Some of your duties may involve setting up traffic control devices or setting up signs. Moving traffic control devices is not done while actually flagging but when you as a flagger have been assigned other duties

In order to protect yourself you must be able to:

- *Understand and respond to traffic emergencies.*
- *Maneuver quickly-not a job for light duty.*
- *Understand what is needed to control traffic.*
- *Receive and communicate information.*
- *Interact with the public without frustration.*
- *Take charge of traffic when needed.*
- *Anticipate possible traffic emergencies and be able to respond quickly.*
- *Handle a paddle especially during long hours and high wind.*

2.2 Rules of Conduct

1. *Look at the whole road, not just at the traffic you are controlling especially when stopping the first vehicle.*
2. *You need to position yourself so you can see any traffic approaching.*
3. *Flagging in an intersection will not allow you to see all your hazards. This includes a "T" in the road. (See WAC code in appendix)*
4. *Do not flag while sitting, sitting in a vehicle or are on the tailgate or bed of a truck.*
5. *Consider where the sun is in reference to driver visibility.*
6. *Assume road users do not see you.*
7. *If possible, make eye contact with the first driver when directing driver to stop.*
8. *Make sure you have an escape route that is 90^0 from the road. If something like a cyclone fence or rail is will be in the way of your escape route, bring to superintendent's attention immediately.*
9. *Do not stand in front of or behind stopped vehicles.*
10. *Use the radio for business only. Do not use for chatting or non-work-related talk.*
11. *Do not use any communication device that takes your attention away from your duties.*

2.2 Rules of Conduct (Continued)

12. *Do not allow fellow workers to congregate around you. You must be visible as a flagger.*
13. *Be aware of construction vehicle activity. You may need to stop traffic due to an unforeseen event like rolling debris or material.*
14. *Avoid flagging on bridges or overpasses due to poor escape route.*
15. *Establish an emergency warning signal to alert co-workers of an emergency-this may be a whistle, air horn or other equally effective method.*
16. *Do not leave your assigned position unless relieved by a certified flagger or no longer needed.*
17. *Cover, remove or turn any signs that no longer apply to the situation.*
18. *Never stand in an active lane of traffic.*
19. *A flagger shall stand either on the shoulder adjacent to the road user being controlled or in the closed lane.*
20. *Only stand in the lane being used by moving road users after the road users have been stopped.*

Good traffic control will help:

- *Avoid confusion.*
- *Have fewer accidents.*
- *Keep road users from being frustrated.*
- *Keep yourself and co-workers safe.*

CHAPTER 3

3.0 PPE, Equipment, and Severe Weather

Personal Protective Equipment is one of the easiest things to do to be seen by road users. This includes vehicles, pedestrians and construction vehicles. As a flagger you are required to wear high visibility garments meeting the requirements set forth in ANSI. (See definition below)

VISIBILITY is very important. As a flagger you must be visible both day and night and wear apparel that will protect you from the elements. For example, you may be working during the summer months when it is extremely hot and sunny, or 36 degrees and rainy. In addition, if you are not properly clothed, you might find yourself covered with hot oil, or tar — both of which can give you a very nasty burn.

Your apparel needs to be professional and cause you to stand out as an authority figure. If road users see you recognized as a flagger, they will be more apt to appreciate and follow your instructions. If not, you will not be able to command respect from either the motorists or the work crew.

A flagging station is no place for getting a tan or wearing inappropriate clothing. Flagging is a serious responsibility and YOU MUST BE DRESSED APPROPRIATELY. Standard shirts with sleeves and long pants are a minimum requirement besides your PPE. Now, let's look at what you should wear.

3.1 High-Visibility Safety Apparel

Flaggers shall wear safety apparel meeting the requirements of American National Standards Institute or International Safety Equipment Association for High-Visibility Apparel (ANSI/ISEA) and labeled as meeting the ANSI/ISEA 107-2004 (or later) standard performance for Class 2 or Class 3 risk exposure. For ANSI/ISEA 107-2015 Specifically type "R" for roadway work.

The apparel material shall be either fluorescent orange-red or fluorescent yellow-green as defined in the standard with retroreflective material color of either orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors. The retroreflective safety apparel shall be designed to clearly identify the wearer as a person.

***Daytime Operations –** Flaggers shall wear Class 2 or 3 high-visibility vest or jacket. Class 2 T-shirts are not allowed for flagging operations. Note, most high visibility shirts and hoodies are not class 2 or 3 because the retroreflective banding is not 360^0. In other words, your upper torso would not be seen at night if you were standing sideways. Therefore, wearing a Class 2 vest is the minimum requirement while flagging.*

Nighttime Operations – An ANSI 107 Class E labeled lower garment (pants or gaiters) must be added to the Class 2 or 3 jacket or vest.

***Nighttime controls are placed ½ hour before sunset and ½ hour after sunrise.** During the winter months, day shift may very well follow nighttime controls for a few hours.*

Wearing the Class 2 vest with the Class E lower garment becomes a Class 3 combo. Wearing the Class 3 jacket with the trousers becomes a Class 3 combo as well. Flagger's apparel must be visible to approaching traffic for 1000 feet.

*It is recommended to wear the high visibility trousers with retroreflective banding at night regardless of what state you are flagging in because it identifies you as a person and you are more likely to stand out to road users. **In Washington state it is a requirement.***

When uniformed law enforcement officers are used, high-visibility safety apparel as described in this section should be worn by the law enforcement officer. This standard is also true for any workers working out in or near traffic. NEVER take up your flagging position without wearing approved apparel.

3.2 Hard Hats

This item of PPE is also required. Hard hats must conform to ANSI/ISEA Z89.1-2009. You must wear either a white, orange, red, yellow or yellow green hard hat. At night the hard hat is required to have 12 inches of retroreflective banding with 360^0 visibility. Typically, this is done with peal

and stick strips. 3 inches are placed on each of the four sides. Retroreflective stickers meeting the above requirements are also acceptable.

Wearing a hard hat identifies you as part of the work crew to both motorists and the construction crew. In addition, a hard hat will protect your head from flying debris and other dangers on construction sites. At night the hardhat with the included retroreflective banding helps identify you as a person.

3.3 Footwear

Always wear substantial shoes or work boots. Footwear must meet the requirements of sturdy and not tennis shoe like. If it is not a work-shoe or boot, it is probably not correct. WAC 296.155.212 states, "Substantial footwear, made of leather or other equally firm material, must be worn." Many companies require a boot, so it is best to have boots as part of your PPE. Another reason to wear boots is due to some of the activities which flaggers are involved. Furthermore, road surfaces tend to get very hot and heavy-soled boots will best protect your feet. You may also be working in rocky or uneven surface areas and boots with ankle support may help you keep your footing and protect you from sharp rocks. Tennis shoes will not protect your feet in this case, but heavy work boots might. Finally, it just makes good common sense to wear work boots or heavy shoes around construction equipment.

3.4 Other Things You May Need

If loud, potentially damaging noises are present, you may need to wear hearing protection. Washington State has established an 8-hour threshold of 85dB. Typically, when next to a busy road with construction traffic, a flagger will exceed this threshold.

Long sleeved shirts and pants will not only protect you from dust, oil and tar, but also will keep you from becoming overexposed to the sun or insects. Sunscreen is also helpful when exposed to the summer heat, just remember to apply 15 to 20 minutes before exposure and throughout the day. Heavy gloves in the winter or light gloves in the summer will serve the same general purposes, protection and comfort. If you wear contact lenses, you may find dust will irritate your eyes. Thus, you may want to wear a pair of prescription glasses instead.

Here is a list of additional items to consider:

- *Adequate water - count on half your body weight in fluid ounces (more when hot)*
- *Whistle or other warning device*
- *Rain gear - think high visibility garments*
- *Safety glasses*
- *Nighttime - flashlight with orange cone diffuser*

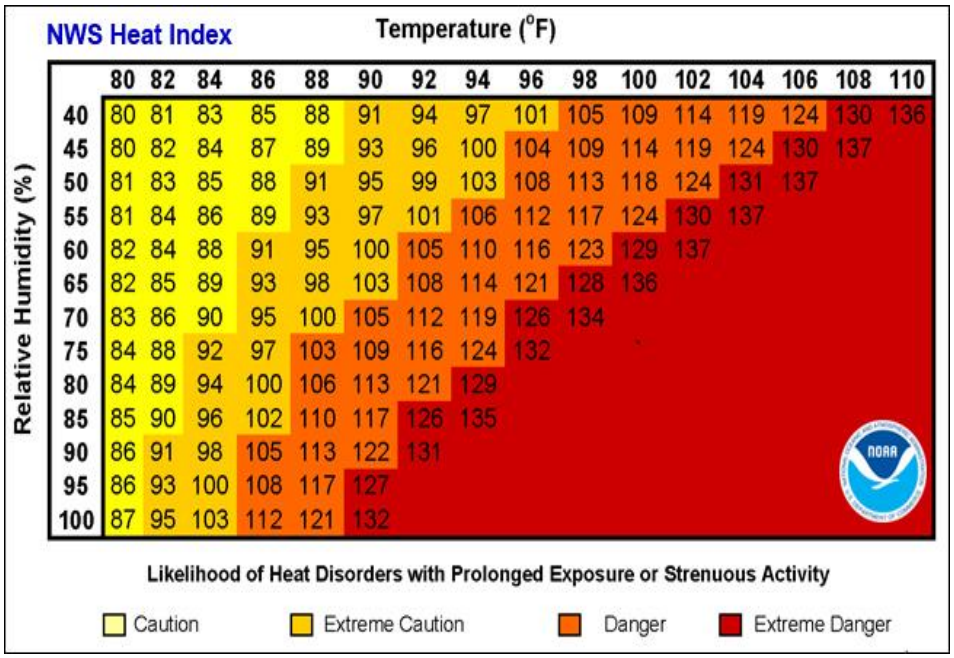
3.5 Temperature Hazards and Severe Weather

Heat – *The best way to prevent heat exhaustion is prevention. This may involve drinking water before you are thirsty, or communicating with other workers to see how they are doing. No job is so important to risk heat exhaustion or heat stroke. When you are standing out in the heat on or next to black asphalt, your body may struggle to keep cool. Humidity also plays a huge role in your body's ability to cool down. Washington State has a heat chart to help understand the effects of heat on your body.*

Outdoor Temperature Action Level	
All other clothing	*89 degrees Fahrenheit*
Double layer woven clothes including coveralls, jackets and sweatshirts	*77 degrees Fahrenheit*
Non-breathing clothes including vapor barrier clothing or PPE such as chemical resistant suits	*52 degrees Fahrenheit*

Heat Exhaustion	
Symptoms: • *Cramps* • *Headaches* • *Clumsiness* • *Dizziness, lightheadedness, fainting* • *Weakness or exhaustion* • *Heavy sweating, clammy, or moist skin* • *Irritability, confusion* • *Nausea, vomiting* • *Paleness*	*Response:* • *Loosen and remove heavy clothing that restricts evaporative cooling* • *If conscious, provide small amounts of cool water to drink* • *Fan person, spray with cool water, or apply a wet cloth to skin to increase evaporative cooling* • *Call 911 if not feeling better within a few minutes*
Heat Stroke	

Symptoms:	*Response:*
• *Sweating may or may not be present* • *Red or flushed, hot dry skin* • *Bizarre behavior* • *Mental confusion or losing consciousness* • *Panting/rapid breathing* • *Rapid or weak pulse* • *Seizures or fits*	• *Call 911* • *Move person to a cooler place (do not leave alone)* • *Cool worker rapidly* • *Loosen and remove heavy clothing that restrict evaporative cooling* • *Fan person, spray with cool water, or apply a wet cloth to skin to increase evaporative cooling*



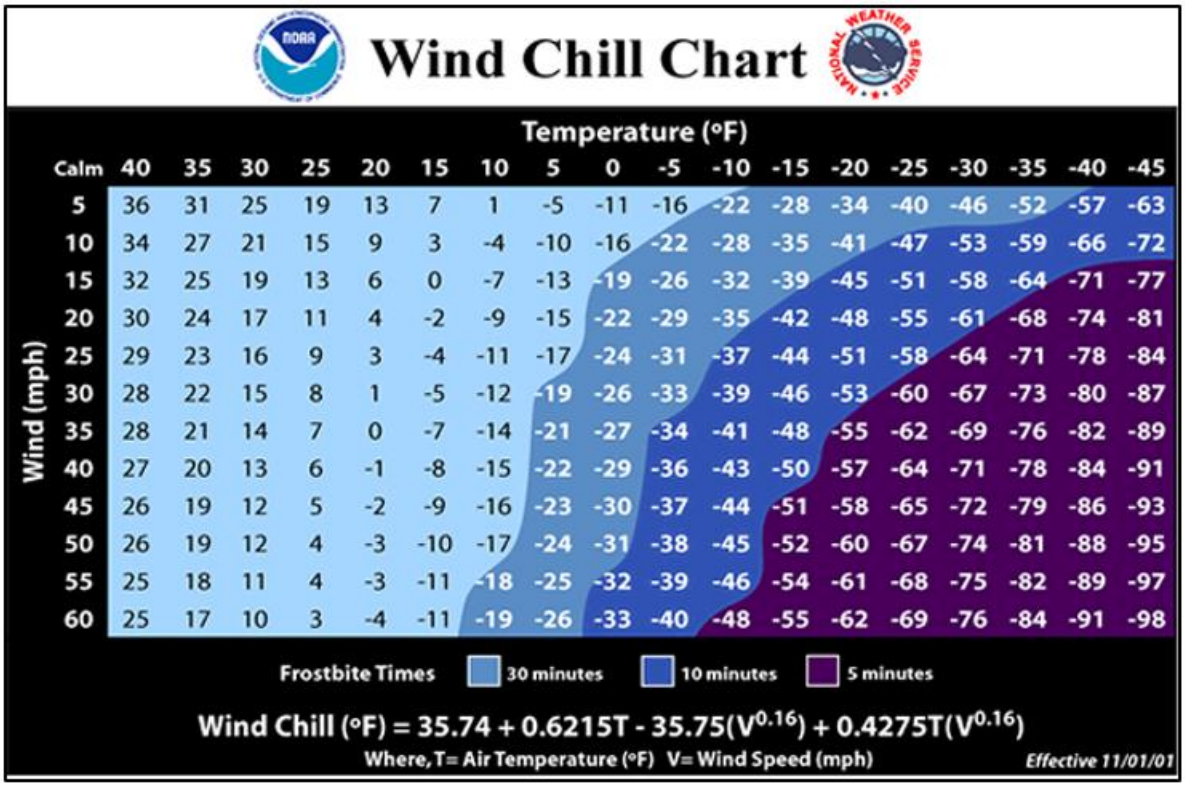
3.6 Cold Weather

Cold – *In the Pacific Northwest cold weather is not as large a concern as in other parts of the United States. However, what we do not have in cold weather we make up in heavy rain and some of our rain combined with cold temperatures in the range of 35 to 40 degrees can be more of a strain on your body than dry conditions of 20 degrees.*

Staying dry is your first priority, followed by wearing layers of clothing including wool or wool blends. If wind is also involved, your body may have difficulty keeping your body warm. The wind is literally removing heat from your body.

Hypothermia	
Symptoms: • *Shivering (may stop as temp drops)* • *Slurred speech or mumbling* • *Slow, shallow breathing* • *Weak pulse* • *Clumsiness* • *Drowsiness or low energy*	*Response:* • *Call 911* • *Move person inside or out of wind and rain* • *Insulate them from the ground* • *Remove wet clothing and replace with warm* • *Offer warm sweet, nonalcoholic drinks* • *Consider use of CPR if trained*

Frostbite	
Symptoms: • *Fumbles with task/uncoordinated* • *Violent shivering* • *Weak pulse* • *Slow breathing* • *Personality changes*	*Response:* • *Call 911* • *Move person inside or out of wind and rain* • *Give warm food or drink* • *Handle them carefully* • *External heat source*



CHAPTER 4

4.0 Hazard Awareness

There are many hazards on a jobsite, heavy equipment, errant vehicles, distracted drivers, speeding drivers and foreign debris to name a few. Staying alert while flagging is going to be the most effective tool you have but staying alert is not enough. It is also important to know where to stand as well as effective methods of communication so hazardous situations are not created.

The main way information is communicated to flaggers is through the use of a briefing or "Toolbox" talk. Sometimes this is also referred to as a "Pre-task" plan. Regardless of what it is called, some key items are the:

- *Flagger's role and location on the job site.*
- *Motor vehicle and equipment in operation at the site.*
- *Job site traffic patterns.*
- *Communication and signals to be used between flaggers and equipment operators.*
- *On-foot escape route.*
- *Escalation procedure to report problems or issues that may arise while flagging.*

4.1 Equipment movement

After road users have been stopped it is often when road work vehicles start moving in and around you. It is important for you to keep alert to activity around you. Do not only look at the traffic stopped. Position yourself so you can see all road users. This means you will need to turn your head to keep a watch for dangerous situations. Just like when you drive a car, you do not only look ahead but glance at the mirrors and side to side. This is referred to as defensive driving and the same concept will help you while flagging.

***Remember**:*

If it is your job to be an observer/spotter for a vehicle, you must:

- *Not be actively flagging as flagging and spotting are both high hazards.*
- *Be clearly seen by the driver either direct or in mirrors.*
- *Keep a watch for possible obstacles or collisions.*
- *Do not go back and forth behind vehicle, stay in operators view at all times.*

Operating Dump Trucks in Reverse WAC 296-155-610-2-f

Operating dump trucks in reverse.

You must make sure the dump truck has an operable automatic reverse signal alarm:

• Audible above the surrounding noise level;

and

• Audible no less than 15 feet from the rear of the vehicle.

(ii) Before backing a dump truck the driver must determine that no one is currently in the backing zone and it is reasonable to expect that no employee(s) will enter the backing zone while operating the dump truck in reverse.

If employee(s) are in the backing zone or it is reasonable to expect that an employee(s) will enter the backing zone, you must make sure the truck is backed up only when:

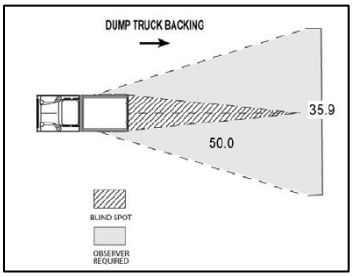
- *An observer signals that it is safe to back;*

or

- *An operable mechanical device that provides the driver a full view behind the dump truck is used, such as a video camera.*

Note:

The following diagram defines the backing zone. Distances are reported in feet.



Exemption:

- *Employees are considered protected when they are on the opposite side of a fixed barrier such as:*
- *A jersey barrier*
- *Heavy equipment (such as a paving machine)*

or

- *A six (6) inch concrete curb.*

The term "dump trucks" includes both belly and rear dump trucks with a minimum payload of 4 yards

4.2 Overhead hazards

Overhead power lines will always be a hazard while working near roads. It is a good idea to check your surroundings to see what overhead hazards exist. Sometimes it is a crane swinging a load and you might need to alert your supervisor, or maybe a dump truck has just dumped a load and is leaving before the bed is fully down. Your alertness may help prevent you from being hit with an overhead power line coming down. If you do encounter a down power line stop and hold all traffic until someone can assess the hazard. If you need to move, shuffle your feet maintaining constant contact with the ground or "bunny hop" so both feet are in the same potential of energy.

4.3 Elevated Roadways

There may be times where it an escape route is available from multiple angles, but this does not mean an escape route should not be devised and designated. Flagging on an overpass should be

avoided if at all possible. Another similar hazard includes flagging where there is a chain link fence along the work site. This hazard can easily be remedied by having a separation between two fence sections. Regardless, if you believe there is a caught in between hazard let your supervisor know as soon as possible so a solution can be sought.

Below is a list of other hazards you may face on the jobsite. Your focus on your job is key to attending to these hazards. If you notice any driver not responding to your signals, you may need to alert your co-workers. If the errant vehicle threatens your life, then drop your paddle and exit the flagger station at 90^0.

Example Hazards:

- *Speeding vehicles*
- *Inattentive drivers*
- *Distracted drivers*
- *Drivers under the influence*
- *Hostile drivers*

4.4 Flagging Station

One of the most important things you must know before you learn to flag is where your flagging station will be. Your Traffic Control Supervisor (TCS) will typically be the one responsible for traffic safety and control, and they will be able to help you determine where you will stand. If you do not have a TCS there will be a lead flagger who will be able to assist.

Your flagging station is important for these reasons:

- *You must be positioned so you are clearly visible to oncoming traffic. This will help you control and direct traffic, as well as ensure your safety on the job.*
- *You must be stationed far enough ahead of the work site so cars and especially so heavily loaded trucks can slow down enough to stop.*
- *You must be close enough to the work being done to protect your fellow workers by alerting them.*

4.5 Where to Stand

To be an effective flagger, you MUST stand where you can be seen. Do NOT stand in the shade, behind a parked car or next to a car. Do not park your own car near your flagging station. We recommend personal vehicles be 200 feet away. When a flagger is actively flagging, they are to stand on the shoulder of the road.

Do NOT stand just over the crest of a hill or just around a curve in a road or on a Freeway. In addition, always take a quick look around to make sure your clothing contrasts with the background. Then, ask yourself, "Can I be seen?" Is there anything which will hide me from the view of either the passing motorists or the work crew? Am I so close to the work crew cars and

trucks will not have time to slow down before entering the area? How fast are the cars and trucks traveling? If you believe you are not visible to cars, or you may be too close to the work area and cars are coming at too great a speed to stop—tell your supervisor.

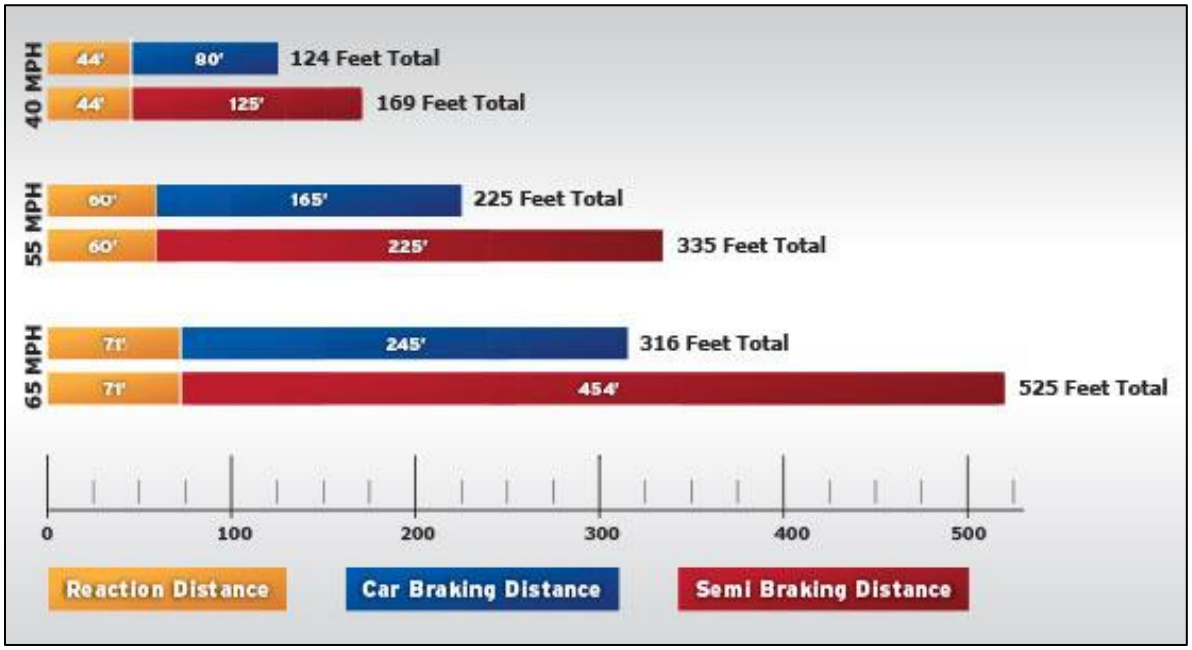
At times you may have emergency vehicles such as firetrucks or ambulances needing to pass through your area to respond to an emergency. You should try to warn these vehicles as you would any other driver of the construction situation ahead. It is, however, up to the driver of the emergency vehicle to decide whether or not to slow down. If the emergency vehicle passes despite your warning or flagging efforts, you should try to alert the crew ahead. If you have a radio, whistle, or air horn use it. Never leave your station. If the road construction involves a one lane road, the emergency vehicle may need to wait until you can establish a clear lane.

Even though the emergency vehicle has the right of way, they may not know the hazard and it is your responsibility to give them direction and guidance.

Remember, behind the emergency vehicle will be other cars and trucks who will NEED to be controlled. Thus, use your COMMON SENSE and GOOD JUDGMENT when you become involved with fast moving emergency vehicles.

4.6 Stopping Distances

Be sure that the cars and trucks, no matter where you are standing, have enough room to stop. This generally can be explained by looking at the stopping distances chart which is provided below. It is important you understand the stopping distance chart. In addition, when trying to figure out how long it will take a truck to stop, you should always assume that the truck is loaded. A heavily loaded truck will take more distance and time to stop. If the truck is moving down a hill or steep grade, they may need even more space.



The MUTCD has developed Table 6E-1 to help set a standard for Stopping Sight Distance. This table provides best practice regarding the stopping sight distance as a function of speed. Size of vehicle, weather conditions and volume will affect these ideal conditions.

Speed	20	25	30	35	40	45	50	55	60	65	70	75
Table 6E-1	115	155	200	250	305	360	425	495	570	645	730	820

Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed.

4.7 Flagger Stations

Flagger stations should be located such that an errant vehicle has additional space to stop without entering the workspace. The flagger should identify an escape route which can be used to avoid being struck by an errant vehicle.

When a single flagger is used, the flagger should be stationed on the shoulder opposite the spot lane closure or workspace, or in a position where good visibility and traffic control can be maintained at all times. This is done on low-volume, low speed situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions.

Also, except in emergency situations, flagger stations shall be preceded by advanced warning signs and stations shall be illuminated at night. (see Lighting Devices) As a result of the high hazard of flagging, Washington State requires a full sign set up anytime flaggers are used.

CHAPTER 5

5.0 Pedestrians and Bicyclists

Since pedestrians and cyclists are more vulnerable in a traffic control zone, a chapter will be devoted to their safety. Unlike cars or trucks which can drive around until a better route is found, some pedestrians with disabilities physically cannot easily get around.

Often a sidewalk must be closed down during construction activity. Sometimes a sidewalk or bike lane is the only lane closed during construction. Some examples of this might be during demolition where pedestrians and cyclists, with no protection from debris, might be injured by debris or a construction site where an office trailer needs additional real estate to conduct work activity.

Before and during any sidewalk closure, a physical walk through should be performed before work begins and attention given during the work activity. Flagger may need to give guidance to help pedestrians through or around the worksite.

Some of the important items to consider are:

- *ADA approaches*
- *Bus stops*
- *Irregular surfaces*
- *Signs encroaching into sidewalk*

A canopied walkway may be used to protect pedestrians from falling debris and to provide a covered passage for pedestrians. When temporary pedestrian pathways in TTC zones are designed or modified to accommodate the needs of pedestrians, including those with disabilities, the following considerations should be addressed:

- *Provisions for continuity of accessible paths for pedestrians;*
- *Access to transit stops;*
- *A smooth, continuous hard surface should be provided throughout the entire length of the temporary pedestrian facility;*
- *There should be no curbs or abrupt changes in grade or terrain which could cause tripping or be a barrier to wheelchair use. See the Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) for more information;*
- *The width of the existing pedestrian facility should be provided for the temporary facility if practical;*
- *Traffic control devices and other construction materials and features should not intrude into the usable width of the sidewalk, temporary pathway, or other pedestrian facility; and*
- *When it is not possible to maintain a minimum width of 60 inches throughout the entire length of the pedestrian pathway, a 60 x 60-inch passing space should be provided at least every 200 feet to allow individuals in wheelchairs to pass.*
- *Blocked routes, alternate crossings, as well as sign and signal information should be communicated to pedestrians with visual disabilities by providing devices such as audible information devices, accessible pedestrian signals, or barriers and channelizing devices which are detectable to the pedestrians traveling with the aid of a long cane or who have low vision.*
- *Where pedestrian traffic is detoured to a TTC signal, engineering judgment should be used to determine if pedestrian signals or accessible pedestrian signals should be considered for crossings along an alternate route.*
- *When channelization is used to delineate a pedestrian pathway, a continuous detectable edging should be provided throughout the length of the facility such that pedestrians using a long cane can follow it.*
- *Signs and other devices mounted lower than 7 feet above the temporary pedestrian pathway should not project more than 4 inches into accessible pedestrian facilities.*

(Many of the preceding considerations are often resolved using jersey barriers)

The MUTCD states – *If the TTC zone affects the movement of pedestrians, adequate pedestrian address and walkways shall be provided. If the TTC zone affects an accessible and detectible pedestrian facility, the accessibility and detectability shall be maintained along the alternate pedestrian route.*

5.1 Controlling Pedestrians

Below are some considerations when controlling or guiding pedestrians:

- *If a pedestrian will not obey your command to use an alternate route, simply state that the sidewalk is closed and is not open for use. If they continue, you may need to alert crews to stop work activity until the scene is safe again.*
- *If you are a spotter for a truck backing across a sidewalk, maintain eye contact with driver at all times. If a pedestrian does not yield while the truck is backing up, driver must stop activity until scene is safe.*
- *If a sidewalk is closed due to construction activity, you are to know the alternate route(s) so the pedestrian can travel to their destination.*

5.2 Bicyclists

Below are some considerations when controlling or guiding pedestrians including.

- *Bicyclists have the choice to ride on the roadway, on the shoulder of a road, in a bicycle lane, or on a sidewalk. Regardless they are still required to obey your instructions.*
- *Traffic law violations cause most bicycle/motorist collisions.*

Therefore, it is important you stay alert to cyclists traveling through the TTC zone. Your good judgement may prevent a fatality.

5.3 Angry Motorist

Motorists may become frustrated or angry when delayed while driving in a work zone that requires them to slow down or stop. Flaggers should be courteous and calm in dealing with hostile drivers. A flagger should always avoid confrontation or using words, body language or behavior that could incite verbal or physical aggression. If you believe there is a danger to you, protect yourself, engaging with an angry motorist will only escalate the problem.

CHAPTER 6

6.0 Hand-Signaling Devices

The STOP/SLOW paddle should be the primary and preferred hand-signaling device because the STOP/SLOW paddle gives road users more positive guidance than red flags. Use of flags should be limited to emergency situations.

The STOP/SLOW paddle shall have an octagonal shape on a rigid handle. STOP/SLOW paddles shall be at least 18 inches wide with letters at least 6 inches high, ***24" x 24" for all WSDOT projects to improve visibility****. The STOP (R1-1) face shall have white letters and a white border on a red background. The SLOW (W20-8) face shall have black letters and a black border on an orange background. When used at night, the STOP/SLOW paddle shall be retro reflectorized.*

The optimum method of displaying a STOP or SLOW message is to place the STOP/SLOW paddle on a rigid staff tall enough that when the end of the staff is resting on the ground, the message is high enough to be seen by approaching or stopped traffic and does not obstruct the flagger's view.

The STOP/SLOW paddle may be modified to improve conspicuity by incorporating either white or red flashing lights on the STOP face, and either white or yellow flashing lights on the SLOW face. The flashing lights may be arranged in any of the following patterns as described in the MUTCD section 6E.03.

Example Paddle Configuration: *Two white or red lights, one centered vertically above and one centered vertically below the STOP legend; and/or two white or yellow lights, one centered vertically above and one centered vertically below the SLOW legend.*

Flags, when used, shall be red or fluorescent orange/red in color, be a minimum of 24 inches square, and be securely fastened to a staff approximately 36 inches in length. The free edge of a flag should be weighted so the flag will hang vertically, even in heavy winds. When used at nighttime, flags shall be retro reflectorized red.

6.1 Emergency Flagging

A general definition of an emergency is, "natural disaster, or other unplanned event that affects or impedes the normal flow of traffic." Washington Administrative Code states in 155-305 "An unforeseen occurrence endangering life, limb, or property." This sometimes is the case but on a long-term active jobsite, it would be difficult to constitute an emergency. Emergency flagging is the only time there is an exception to have a full sign set up.

When flagging in an emergency situation at night in a non-illuminated flagger station, a flagger may use a flashlight with a red glow cone to supplement the STOP/SLOW paddle or flag.

When a flashlight is used for flagging in an emergency situation at night in a non-illuminated flagger station, the flagger shall hold the flashlight in the left hand and shall hold the paddle or flag in the right hand as described below.

- *To inform road users to stop, the flagger shall hold the flashlight with the left arm extended and pointed down toward the ground, and then shall slowly wave the flashlight in front of the body in a slow arc from left to right such that the arc reaches no farther than 45 degrees from vertical.*
- *To inform road users to proceed, the flagger shall point the flashlight at the vehicle's bumper, slowly aim the flashlight toward the open lane, then hold the flashlight in that position. The flagger shall not wave the flashlight.*
- *To alert or slow traffic, the flagger shall point the flashlight toward oncoming traffic and quickly wave the flashlight in a figure eight motion.*

6.2 Automated Flagger Assistance Devices

Automated Flagger Assistance Devices (AFADs) enable the flagger(s) to be positioned out of the lane of traffic and are used to control road users through temporary traffic control zones. These devices are designed to be remotely operated either by a single flagger at one end of the TTC zone or at a central location, or by separate flaggers near each device's location.

There are two types of AFADs:

The first type of AFAD device will use a remotely controlled STOP/SLOW sign on either a trailer or a movable cart system to alternately control right-of-way. The second type of AFAD device uses remotely controlled red and yellow lenses with a gate arm to alternately control right-of-way.

AFADs might be appropriate for short-term and intermediate-term activities. Typical applications include TTC activities such as, but not limited to:

1. *Bridge maintenance*
2. *Haul road crossings*
3. *Pavement patching*

For AFAD usage see section see Section 8.10 of this manual or 6E.08 of the MUTCD for more information.

6.3 Method of Signaling

The following methods of signaling with paddles shall be used:

To stop road users – *the flagger shall face road users and aim the STOP paddle face toward road users in a stationary position with the arm extended horizontally away from the body. The free arm shall be held with the palm of the hand above shoulder level toward approaching traffic. Once traffic is stopped the raised hand may be lowered.*

To direct stopped road users to proceed – *the flagger shall face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body. The flagger shall motion with the free hand for road users to proceed.*

To alert or slow traffic – *the flagger shall face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body with your free hand motion slowly up and down.*

Understanding the previous items:

- *Road Users are not only the vehicles approaching your sign. If you stand facing only the traffic you are stopping, you may have an errant vehicle come from behind you without your notice.*
- *Until the first car is stopped, from both directions if two-way traffic, maintain a high level of alertness.*
- *It is best to position your body so you can see vehicles which may approach you from any traveled way.*
- *This is done on the shoulder of the road with your feet predominately facing the traffic you are controlling with the ability to glance at the traffic coming from the other way.*

Understanding the previous items: (Continued)

- *Your main focus is the traffic you are stopping but hazards come from unexpected areas. The hazard may come from the equipment movement during the stop.*
- *It is best to use the right hand to control the stop/slow paddle. This keeps your body positioned toward the oncoming traffic.*
- *When releasing the vehicles, be very clear where you want them to go. With cone spacing at a minimum of 20 feet, there is plenty of room for a vehicle to easily enter your coned off area.*
- *Never wave the stop paddle to get the drivers attention. If drivers seem to not respond to your signals, it might be;*
    - *Your advanced warning signs have fallen over.*
    - *You are not standing in clear sight of the road users.*
    - *The sun is obscuring their vision of you.*
    - *Additional signage is needed such as flags mounted to signs or, at night, flashing light on or by sign.*
- *Always assume there is a problem with the TTC zone and not inattentiveness of the drivers, especially if problem persists.*
- *Alert supervisor to the problem. Driving through your own TTC zone may alert you to the problem.*
- *When directing traffic to proceed slowly, remember to periodically look in the direction traffic is headed to anticipate a need to stop traffic again. You, not traffic, should see a problem and respond.*

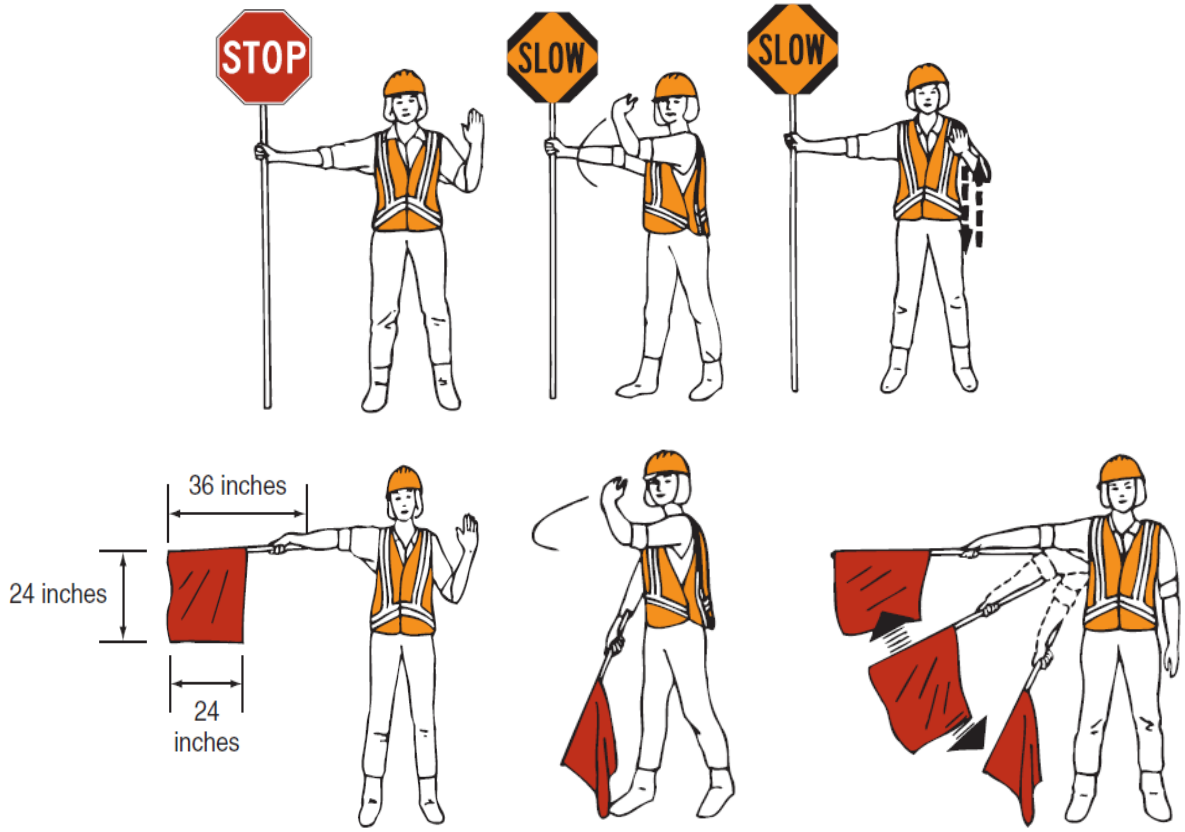
The following methods of signaling with a flag shall be used:

1. *To stop road users, the flagger shall face road users and extend the flag staff horizontally across the road users' lane in a stationary position so that the full area of the flag is visibly hanging below the staff. The free arm shall be held with the palm of the hand above shoulder level toward approaching traffic.*

2. *To direct stopped road users to proceed, the flagger shall face road users with the flag and arm lowered from the view of the road users and shall motion with the free hand for road users to proceed. Flags shall not be used to signal road users to proceed.*
3. *To alert or slow traffic, the flagger shall face road users and slowly wave the flag in a sweeping motion of the extended arm from shoulder level to straight down without raising the arm above a horizontal position. The flagger shall keep the free hand down.*

The flagger should stand either on the shoulder adjacent to the road user being controlled or in the closed lane prior to stopping road users and should only stand in the lane being used by moving road users after road users have stopped and ensure the following:

The flagger should be clearly visible to the first approaching road user at all times, and should also be visible to other road users. The flagger should be stationed sufficiently in advance of the workers to warn them (for example, with audible warning devices such as horns or whistles) of approaching danger by out-of-control vehicles. The flagger should stand alone, away from other workers, work vehicles, or equipment.



6.4 Flagging at Intersections

When work will occur near an intersection where operational, capacity, or pedestrian accessibility problems are anticipated, the highway agency having jurisdiction shall be contacted. For work at an intersection advance warning signs, devices, and markings should be used on all cross streets, as appropriate. In other words, all road users need a minimum of a three-sign warning.

If the work is within the intersection, any of the following strategies may be used:

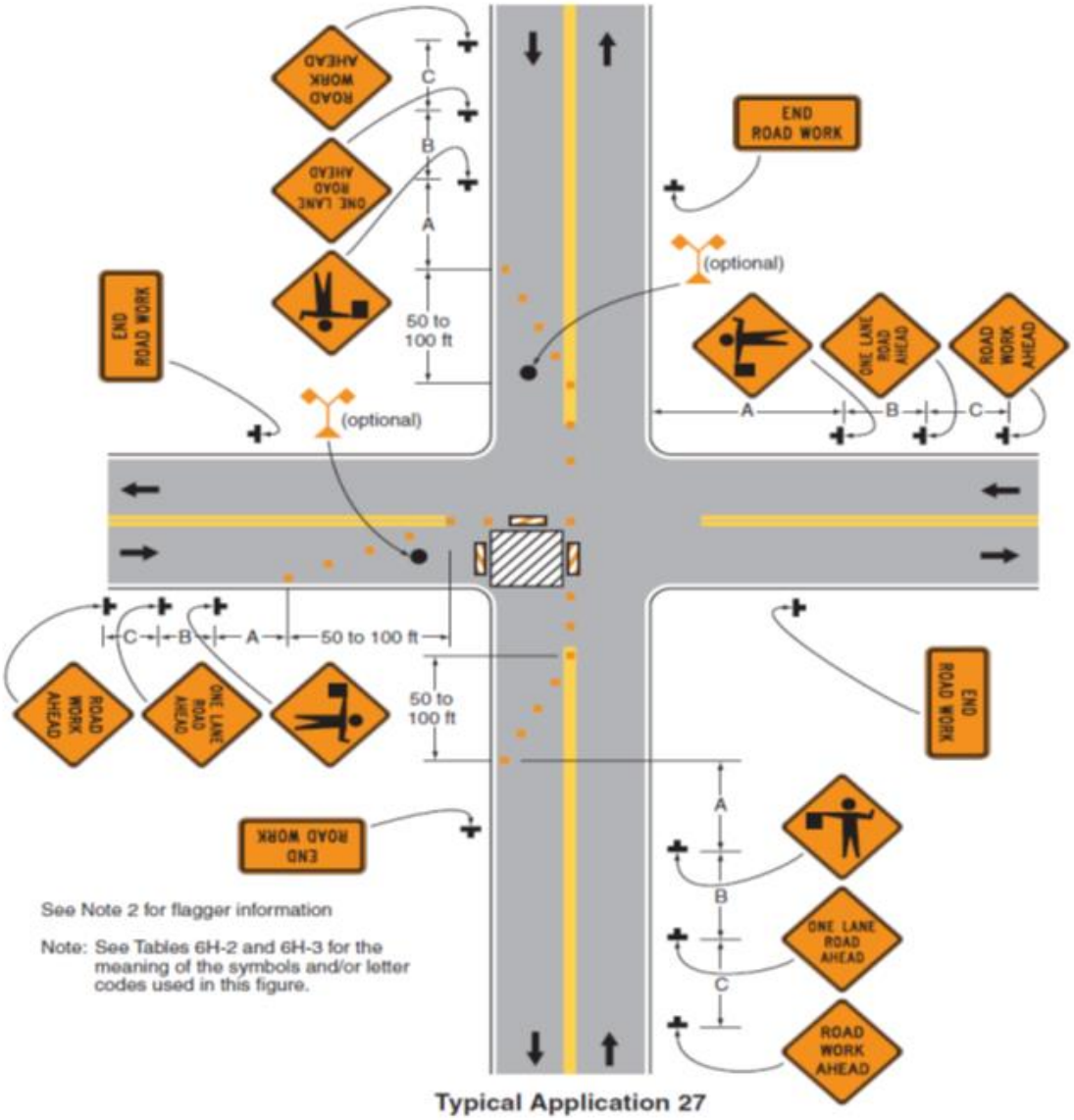
- *A small workspace so road users can move around it (See Figure 6H-27)*
- *Flaggers or uniformed law enforcement officers to direct road users**
- *Work in stages so the workspace is minimized*
- *Road closures or upstream diversions to reduce road user volumes.*

**Washington State only allows a Uniformed Law Enforcement Officer to direct traffic from the center of an intersection.*

It is recommended a flagger station be at least 50 feet from any intersection if the lights are not disabled or turned to flashing red. Also, alert drivers they must still obey the active signals. ***At no time shall traffic be flagged with an active signal in full operation.*** *(WAC 468-95-3015)*

Seek prior approval from the traffic engineer before flagging at an intersection. No matter who is performing the intersection flagging, the appropriate advance warning signing is required to be in place. If flaggers are used at an intersection, traffic control lights must be on red flashing or disabled.

Figure 6H-27. Closure at the Side of an Intersection (TA-27)



See Note 2 for flagger information

Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

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6.5 Work in The Vicinity of A Grade Crossing

When a grade crossing exists either within or in the vicinity of a temporary traffic control zone, lane restrictions, flagging or other operations, highway vehicles SHALL NOT be allowed to stop on the railroad or light rail transit (LRT) agency tracks, even if automated warning device are in place. The grade crossing is considered as being 25 feet on either side of the closest and farthest rail.

If the queuing of vehicles across active rail tracks cannot be avoided, a uniformed law enforcement officer or flagger shall be provided at the grade crossing to prevent vehicles from stopping within the grade crossing, even if automatic warning devices are in place.

Early coordination with the railroad company or light rail transit agency should occur before work starts. They may require a railroad flagger for part or full duration of the project. In this case it is best to seek approval from the railroad company before work begins. In the example depicted, the buffer space of the activity area should be extended upstream of the grade crossing (as shown) so a queue created by the flagging operation will not extend across the grade crossing.

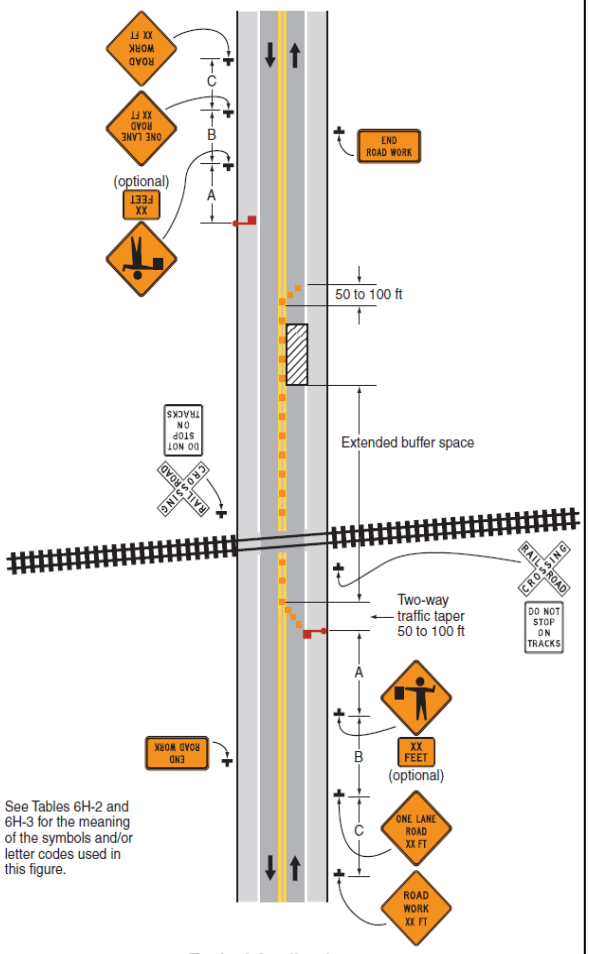
The "DO NOT STOP ON TRACKS" sign should be used on all approaches to a grade crossing within the limits of a TTC zone.

Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

Use of a BE PREPARED TO STOP sign may be added to the sign series.

When used, the BE PREPARED TO STOP sign should be located before the Flagger symbol sign.

Figure 6H-46. Work in the Vicinity of a Grade Crossing (TA-46)



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CHAPTER 7

7.0 Traffic Control Zone Devices

Traffic control device placement and usage is the most important thing you can do to warn road users. It is also one of the more dangerous tasks while working around traffic. Typically, this activity is placing signs along the roadway and setting up the delineated areas using channelization devices usually called cones, tubular markers "candle sticks", drums and in some cases barricades.

Set up of the TTC Zone always begins with the first device, typically the "Road Work Ahead" sign and ends with the last device or a "End of Construction" sign. Removal of the TTC Zone is done in reverse of the set up procedure.

Before any set up is done, a Traffic Control Plan along with an orientation will be performed. In some cases which will be discussed later, a Traffic Control Plan is not required (see Work Duration).

During this time, you should expect to be given clear directions:

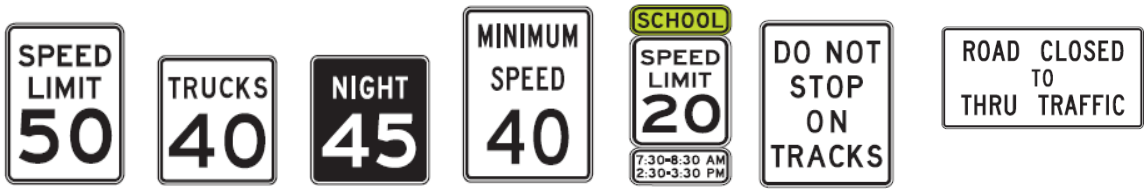
- *Where to stand to flag*
- *The kinds of signs and devices to use*
- *Information and instructions regarding the traffic situation.*

There are three types of signs – REGULATORY, WARNING and GUIDE signs. Each type of sign has a different purpose and function. Each category of signs has a certain color and shape scheme so they can be easily recognized. Highway construction and maintenance signs fall into these three categories. However, for warning and guide signs the background color is generally changed to orange rather than the standard color of yellow or green. In addition, the standard recognizes 13 colors.

7.1 Regulatory Signs

*Regulatory signs impose legal obligations and/or restrictions on **all** traffic. Their use is always authorized by the official or public body having jurisdiction over the road. Speed limit signs are regulatory, as are STOP signs, DO NOT ENTER signs and ONE WAY signs. **Most regulatory signs are** rectangular in shape and carry a black legend on a white surface with black boarders. However, not all regulatory signs are black and white. **STOP signs are** octagonal and has white letters on a red background. **YIELD signs are** white inverted triangles with red letters and a red border.*

Sometimes on a road construction project, the normal regulatory signs such as speed limit signs may need to be removed or covered. For example, a regulatory sign on a highway may set the speed limit for that section of road to be 55 miles per hour. However, if construction requires the traffic will have to slow down to 40 miles per hour in a TTC zone then an authority like City or State would have to authorize the change. (See chapter 1) It is important you know and understand regulatory signs as they do carry the full weight of the law.

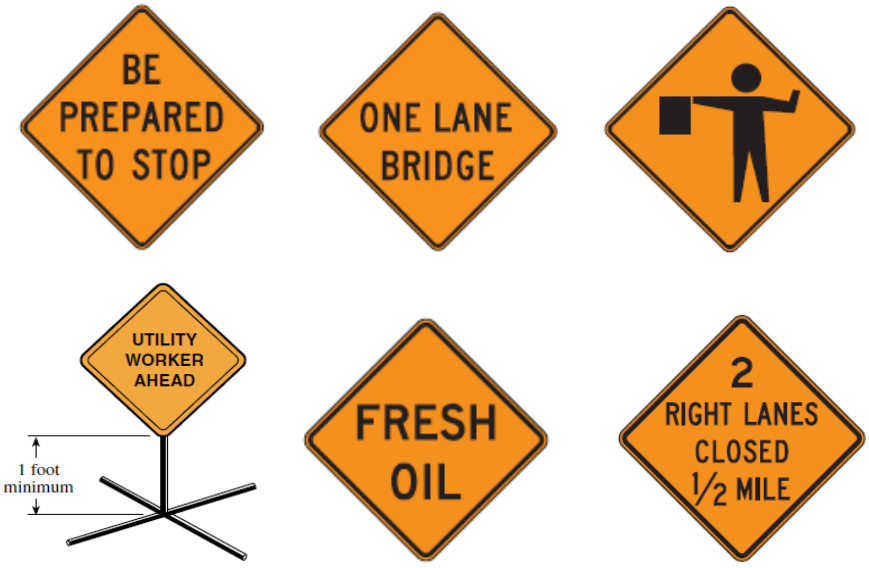


7.2 Warning Signs and Construction

Warning signs are used in a work zone to notify the road users of any temporary roadway conditions or restrictions. ***Construction warning signs are*** *generally (but not always) diamond shaped and carry a black legend and border on an orange background****. At a minimum, temporary signs must be 1 foot of the roadway.***

Signs for most applications will be 36 x 36 inches. This will include city roads and country roads. On WSDOT projects and high speed, above 45 mph, signs are 48 x 48 inches. At a minimum, the bottom of the sigs must be 1 foot of the roadway. If signs are temporally placed along the road, wind may knock them over and may need additional weight, the weight is applied at the base, typically sandbags and must be no more than 4 inches thick. If signs happen to blow over notify your supervisor as an active flagger cannot flag and set up signs or channelization devices.

All new signs and supports must meet the ***MASH-2016*** *crash test requirements. In addition, sign stands must have an identifying label on the stand indicating it meets crashworthy requirements. Do not use anything which would compromise the ability of the sign to yield on impact.*



Where multiple advance warning signs are needed on the approach to a TTC zone, the ROAD WORK AHEAD sign should be the first advance warning sign encountered by road users. Sometimes, if utility work is being done, the first sign is Utility Work Ahead. Typically, three signs

are used. More signs may be needed to alert road users of the roadway conditions. Washington State requires the minimum use of 3 signs and 4 signs on roads with speeds 45 mph or greater.

The following is a list of some of the more commonly used Warning Signs:

***ROAD WORK AHEAD –** This sign is always placed in advance of any road or street work activity.*

It serves to warn oncoming motorists there may be obstructions on the road ahead. It is a generic sign warning road user there is activity which may disrupt normal flow of traffic. This sign is commonly used before other signs, such as FLAGGER AHEAD, RIGHT LANE CLOSED, or DETOUR AHEAD.

***BE PREPARED TO STOP –** This sign most likely will be used whenever there is a flagger on duty. If this sign is used, it should be placed after the ROAD WORK AHEAD sign and before the FLAGGER AHEAD sign. As with all of the signs, road users must have adequate warning before they are expected to stop, change lanes, or negotiate any other concern on the roadway. On a typical setup of ROAD WORK AHEAD, ONE LANE ROAD and FLAGGER AHEAD symbol, the additional sign would be BE PREPARED TO STOP when the speed is 45 mph or greater.*

***ONE LANE ROAD AHEAD –** This sign is frequently used to pinpoint areas where traffic traveling in both directions must use a single lane. Traffic is moved through the area in one direction at a time. Pilot cars, convoy systems, double flaggers an AFAD device, or temporary traffic signals can be used to handle this situation. You will read more about pilot cars and convoy systems later. Depending on the speed, this sign might be the second sign of a 4-sign set up. (45 mph or greater requires a 4-sighn set up)*

***FLAGGER AHEAD –** This sign is always placed in advance of any point where a flagger is going to be stationed. The sign itself alerts motorists to the flagger's presence and gives them an adequate amount of time to begin to slow down. If there is **no** Flagger on duty, the sign SHALL be removed, covered or turned over. It is highly recommended the signs be taken down at night and not covered or turned over as the turned signs, with no high visibility, will be extremely difficult for oncoming motorist to see at night.*

***LANE CLOSED AHEAD –** There are times when one, or several lanes of a multi-lane roadway may be closed due to construction. This sign is used in conjunction with other signs or traffic control devices to help channelize all traffic into open lanes so traffic may move safely and smoothly through a work area. An arrow board/panel in arrow mode shall be used for this situation.*

Motorcyclist Warning sign requirements (RCW 47.36.200)

*A **Motorcycles Use Extreme Caution** (W21-1701) **–** shall be used in advance of any of the following signs when conditions are present:*

- ***Grooved Pavement –** used generally during pavement planning removal*
- ***Abrupt Lane Edges –** used during paving & pavement removal*
- ***Bump -** …..*
- ***Loose Gravel –** used for its particular importance for motorcycles*
- ***Steel Plates –** used to alert drivers to temporary surfaces which can easily ice over or be slippery when wet especially for motorcycles*

Arrow Boards will be discussed in section 8.8)

There are many other signs which may be used. It is important you familiarize yourself with the types and meanings as you use them. If you are unsure of any sign used, ask your supervisor.

7.3 Guide Signs

Guide signs are information signs. They give the motorist information which may be needed to pass through construction zones safely. ***Construction work guide signs are*** *often orange with black letters and a black border and often rectangular. These signs may give special information relating to the work being performed. In addition, there are guide signs which show directions and route markings.*

7.4 Warning Sign Placement

Generally, signs are placed on the right side of the road. On freeways or one-way multiple lane roads, signs are placed on both sides of road. If more or special emphasis is needed, then it would be wise to add additional signs. Table 1 is used for proper spacing of signs. At a minimum, signs must be placed 1 foot off of the traveled way.

Table 1 Advanced Warning Sign Spacing					
Road Type	***Speed***	***Distance between Advanced Warning Signs****			
		*A***	*B***	*C***	*D***
Freeways and Expressways	*70-55*	*1500 ft ± or per the MUTCD*	*1500 ft ± or per the MUTCD*	*1500 ft ± or per the MUTCD*	*1500 ft ± or per the MUTCD*
Rural Highways	*65-60*	*800 ft ±*	*800 ft ±*	*800 ft ±*	*800 ft ±*
Rural Roads	*55-45*	*500 ft ±*	*500 ft ±*	*500 ft ±*	*500 ft ±*
Rural Roads and Urban Arterials	*40-35*	*350 ft ±*	*350 ft ±*	*350 ft ±*	*350 ft ±*
Rural Roads, Urban Streets, Residential Business Districts	*30-25*	*200 ft ± ****	*200 ft ± ****	*200 ft ± ****	*200 ft ± ****
Urban Streets	*25 or less*	*100 ft ± ****	*100 ft ± ****	*100 ft ± ****	*100 ft ± ****

All spacing may be adjusted to accommodate interchange ramps, at-grade intersections, and driveways.

*** This refers to the distance between advance warning signs. Typical Lane Closure on Two-Lane Road. This situation is typical for roadways with speed limits less than 45 mph.*

**** This spacing may be reduced in urban areas to fit roadway conditions.*

In cities where work zones are more restrictive, the signs are often set closer than the 100 feet. This is approved ahead of time by a governing authority such as a city. Since road users may turn before the actual road construction activity, some road users will never go through the construction site.

7.5 Mobile Operations

Mobile operations involve frequent short stops and often involves flaggers. Mobile operations also include work activities where workers and equipment move along the road without stopping, usually at slow speeds. The advance warning area moves with the work area.

Since the advanced warning area moves with the work area, special rules have been introduced by Washington State.

***Exemption:** In a mobile flagging operation, as defined by the MUTCD when the flagger is moving with the operation, the "flagger ahead (symbol or text)" sign must be:*

- *Within 1,500 feet of the flagger; AND*
- *The flagger station must be seen from the sign.*

Due to the unique hazards of mobile work, consider performing the work during off-peak hours especially for high volume conditions.

7.6 Channelization Devices

Channelization of road users should be accomplished by the use of pavement markings, signing, and crashworthy detectable channelizing devices. Channelization devices when placed in a line, provide the motorist a path to drive through. They accomplish the same thing as pavement markings. When the work is shorter, it is not feasible to remove and add pavement marking so drums, candle sticks and or cones are used. Not only do they channelize road users, but they also provide protection for the workspace. In addition to guiding road users through the TTC zone, correctly implemented channelization devices will give:

- *Confidence to road users as they negotiate the TCC zone*
- *Protection to the workers in the TCC zone*
- *Protection to pedestrians in the TTC zone*

The spacing between cones, tubular markers, vertical panels, drums, and barricades should not exceed a distance in feet equal to 1.0 times the speed limit in mph when used for taper

channelization, and a distance in feet equal to 2.0 times the speed limit in mph when used for tangent channelization.

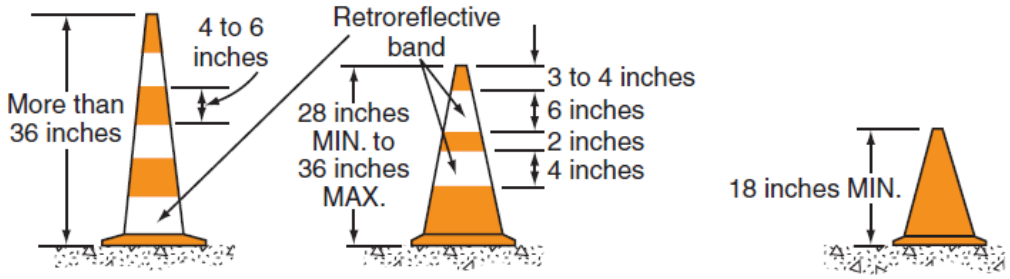
The Tangent is simply a line of channelizing devices which is paralle the work site.

Washington State Device Spacing Chart per WAC 468-95-301		
MPH	***Taper***	***Tangent***
25/30	*20 feet*	*40 feet*
35/45	*30 feet*	*60 feet*
50/70	*40 feet*	*80 feet*
Flagger Taper	*Max 20 feet regardless of speed*	*Follow above speed*

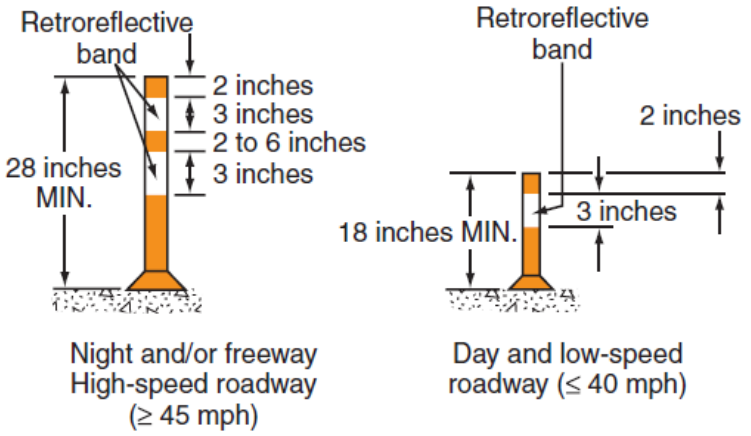
There are three main choices for channelization devices including cones, tubular markers (candle sticks), and drums. Barricades will be discussed later. Each of them has certain requirements for visibility and retro reflections.

7.7 Cones and Tubular Markers

Cones are most commonly used due to smallness and stack ability. Cones and Tubular Markers are predominantly orange and must meet the NCHRP 350 or MASH crash standards as certified by the device manufacturer. See the following pictures for standard.

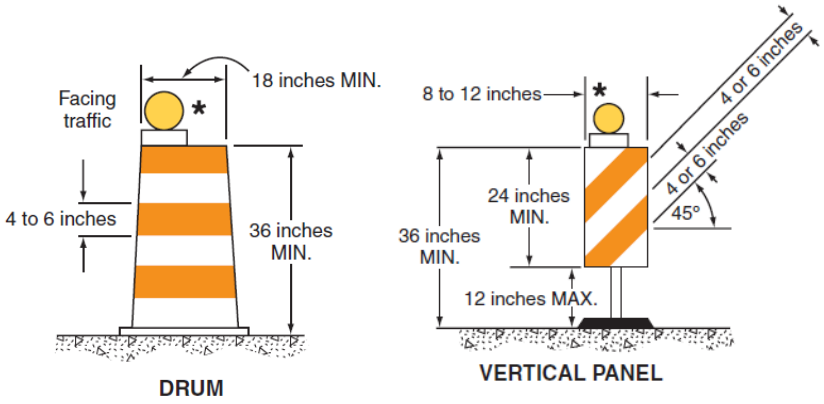


CONES



TUBULAR MARKERS

Drums are 36 inches tall and are the most dominant and preferred device for high-speed high-volume highways because they have the greatest visibility. On the other hand they are heaver and take up more space in the truck. Just like cones and tubular markers, they must meet the NCHRP 350 or MASH crash testing as certified by the device manufacturer.



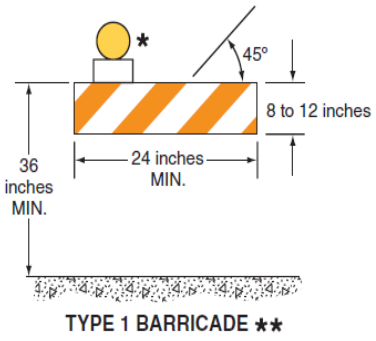
Device	*Day time Requirements*	*Nighttime / ≥45 MPH Requirements*
Cone	*18 inches tall*	*28 inches tall and retroreflective*
Tubular Marker	*18 inches tall*	*28 inches tall and retroreflective*
Drum	*36 inches tall*	*36 inches tall and retroreflective*

Another type of channelization device is the Type I, II or III barricade. These are generally used for road or ramp closures along with other channelizing devices and appropriate signing. Barricades used in work zone applications are portable devices with three primary types:

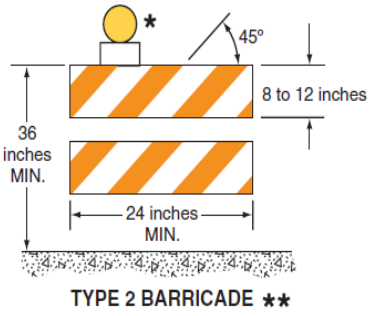
1. *Type 1 Barricade – Used on lower speed roads and streets to mark a specific hazard or can be used for sidewalk closures as appropriate.*
2. *Type 2 Barricade – Used on higher speed roadways and has more reflective area for nighttime use to mark a specific hazard.*
3. *Type 3 Barricade – Used for partial or full road closures.*

The two barricades on the left are showing traffic is to flow to the left of the sign. The one on the right shows traffic flowing around to the right. The number of rows is the type of barricade.

Barricades must be crash test approved per the NCHRP 350 or MASH requirements.



TYPE 1 BARRICADE **



TYPE 2 BARRICADE **

7.8 Temporary Traffic Barriers

Temporary traffic barriers are not TTC devices in themselves. However, when placed in a position identical to a line of channelizing devices and marked and/or equipped with appropriate channelization features to provide guidance and warning both day and night, they serve as TTC devices.

Temporary traffic barriers (See MUTCD 6F.85) shall not be used solely to channelize road users, but also to protect the workspace. If used to channelize vehicular traffic, the temporary traffic barrier shall be supplemented with delineation, pavement markings, or channelizing devices for improved daytime and nighttime visibility.

Temporary traffic barriers should not be used for a merging taper except in low-speed urban areas.

CHAPTER 8

8.0 Setting Up the Traffic Control Zone

Now we are going to put all these items together. We will start from the beginning and work our way through. The first thing we need to know is what type of work will be done so the proper protection is provided. There are 5 categories of work duration.

The five categories of work duration and their time at a location shall be:

1. ***Long-term Stationary –*** *work occupying a location more than 3 days*
2. ***Intermediate-term Stationary –*** *work occupying a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour*
3. ***Short-term Stationary –*** *daytime work occupying a location for more than 1 hour within a single daylight period*
4. ***Short Duration –*** *work occupying a location up to 1 hour*
5. ***Mobile –*** *work which moves intermittently or continuously*

Traffic control planning should be completed for all highway construction, utility work, maintenance operations, and incident management including minor maintenance and utility projects prior to occupying the TTC zone.

Traffic Control Plans (TCPs) should be prepared by persons knowledgeable (for example, trained and/or certified) about the fundamental principles of TTC and work activities to be performed.

Coordination should be made between adjacent or overlapping projects to ensure duplicate signing is not used and to check compatibility of traffic control between adjacent or overlapping projects.

Planning for all road users should be included in the process. A Traffic Control Plan is required in Washington State for any TTC zone lasting more than one day. If the project is for WSDOT, a Traffic Control Supervisor (TCS) will be required.

Long-term and Intermediate-term stationary *work extends into the night. As such, retroreflective or illuminated devices are required. Temporary pavement markings and post mounted signs may be required along with channelizing devices. Existing conflicting pavement markings should be removed.*

Short-term and short duration *may only happen during one single day but if they extend or start before the hours of darkness, they must follow the nighttime rules. (See section 3.1) Even though set up may increase the hazard, the recommended method is to close down all lanes and leave one lane open for the flagger to control.*

Mobile Work *does not mean less hazard. There may be even be more hazards. Consider a vehicle coming around a corner with no warning except the flashing lights on the service vehicle. Sometimes a flagger is needed to help. A full set up of signs may be difficult, but it is more important to protect the flaggers than the ease of the project.*

Safety in short-duration or mobile operations should not be compromised by using fewer devices simply because the operation will frequently change its location. Appropriately colored or marked

vehicles with high-intensity rotating, flashing, oscillating, or strobe lights may be used in place of signs and channelizing devices for short-duration or mobile operations.

Less devices are required because during short-duration work, it often takes longer to set up and remove the TTC zone than to perform the work. Moreover, workers face hazards in setting up and taking down the TTC zone. Also, since the work time is short, delays affecting road users are significantly increased when additional devices are installed and removed.

In Washington State there is no reduction for the minimum three-sign set up, if flaggers are used. The safety of a flagger is more important than saving some time due to the shortness of the operation. (See Appendix 1)

8.1 Temporary Traffic Control Zone (TTC) Zone

The TTC zone is the entire site. It begins with the first traffic control device and ends with the last traffic control device. The first device is the first sign is typically ROAD WORK AHEAD, and is the last traffic control device. The TTC zone is a dangerous place to work. In fact, accidents go up in TTC zones. Since there is traffic revision, there will be more accidents. This is why it is very important your zone excels at communicating a clear message to the road users.

8.2 Components of Temporary Traffic Control Zones

Most TTC zones are divided into four areas:

Advance warning area

Transition area

Activity area *and the*

Termination area

The road users enter the zone and are alerted by appropriately placed signs. The last sign is most informative of what they will do next. If the sign is a FLAGGER AHEAD then they will be stopping, if it is a merging symbol, they will not need a flagger and just merge on their own.

Advance Warning Area – *The advance warning area is the section of highway where road users are informed about the upcoming work zone or incident area. The advance warning area may vary from a single sign or high intensity rotating, flashing, oscillating, a vehicle mounted strobe light, or even a series of signs placed in advance of the TTC zone activity area. Again, when flaggers are used, a full sign set up is required in Washington State.*

8.3 Transition Areas and Tapers

The transition area is the section of highway where road users are redirected out of their normal path. Transition areas usually involve strategic use of tapers which are discussed below in detail because of their importance.

Tapers are used to get road users around and through the TTC zone. The following chart gives relevant details from Washington State Department of Transportation. Lengths are all

minimums. Tapers guide the road users through the work site. Taper lengths may be adjusted to fit the roadway conditions such as ramps, driveways and curves.

There are 5 different tapers used in TTC zones:

- ***One-Lane, Two-Way Taper or Flagger Taper Transition Area –*** *This typically involves at least one flagger, usually two. This taper is used where both directions of traffic must alternately share the same lane. The merging taper is 50 to 100 feet long. Spacing is no more than 20 feet between the devices regardless of the speed and includes 6 devices.*
- ***Merging Taper –*** *The merging taper is the longest as it requires two lanes to merge into one. An arrow panel in arrow mode is used for this operation.*
- ***Shifting Taper –*** *Since this taper does not require road users to merge, it is half-as long as a merging taper. An arrow panel is not used to indicate a shift.*
- ***Shoulder Taper –*** *A shoulder taper is used where the shoulder is wide enough to be used as a lane either by a car or bicyclist. Some road users may use it to make a premature turn and avoid traffic slowdowns.*
- ***Downstream Taper –*** *This is an optional feature to let road users know that the road has resumed to its original function. Sometimes the tangent line is extended instead of a taper to allow merging construction vehicles. Downstream tapers have a similar configuration as One Lane Two Way Tapers (Flagger Tapers), 0 to 100 feet but no more than 20 feet spacing.*

8.4 Examples of Transition Areas and Taper Type

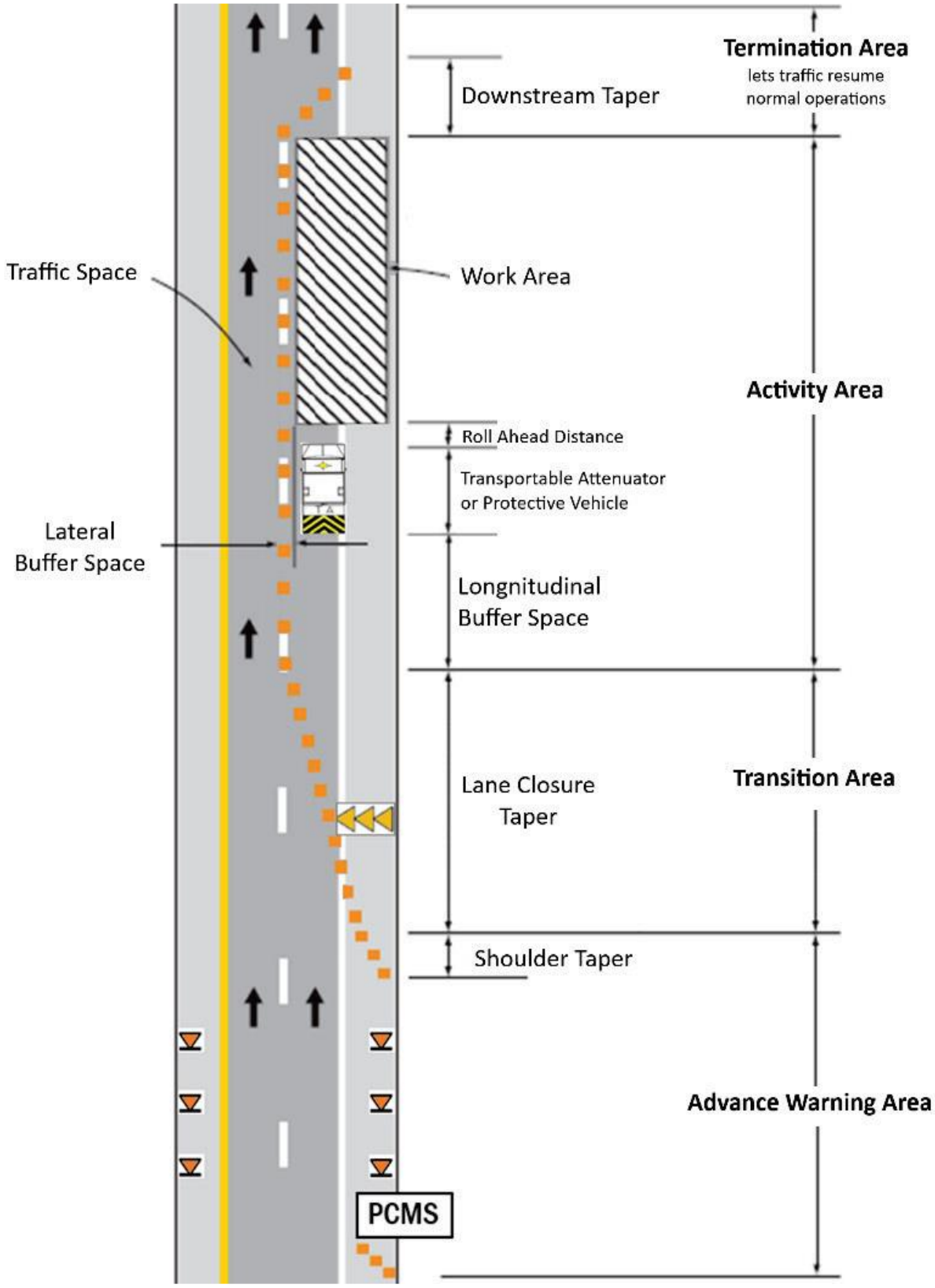
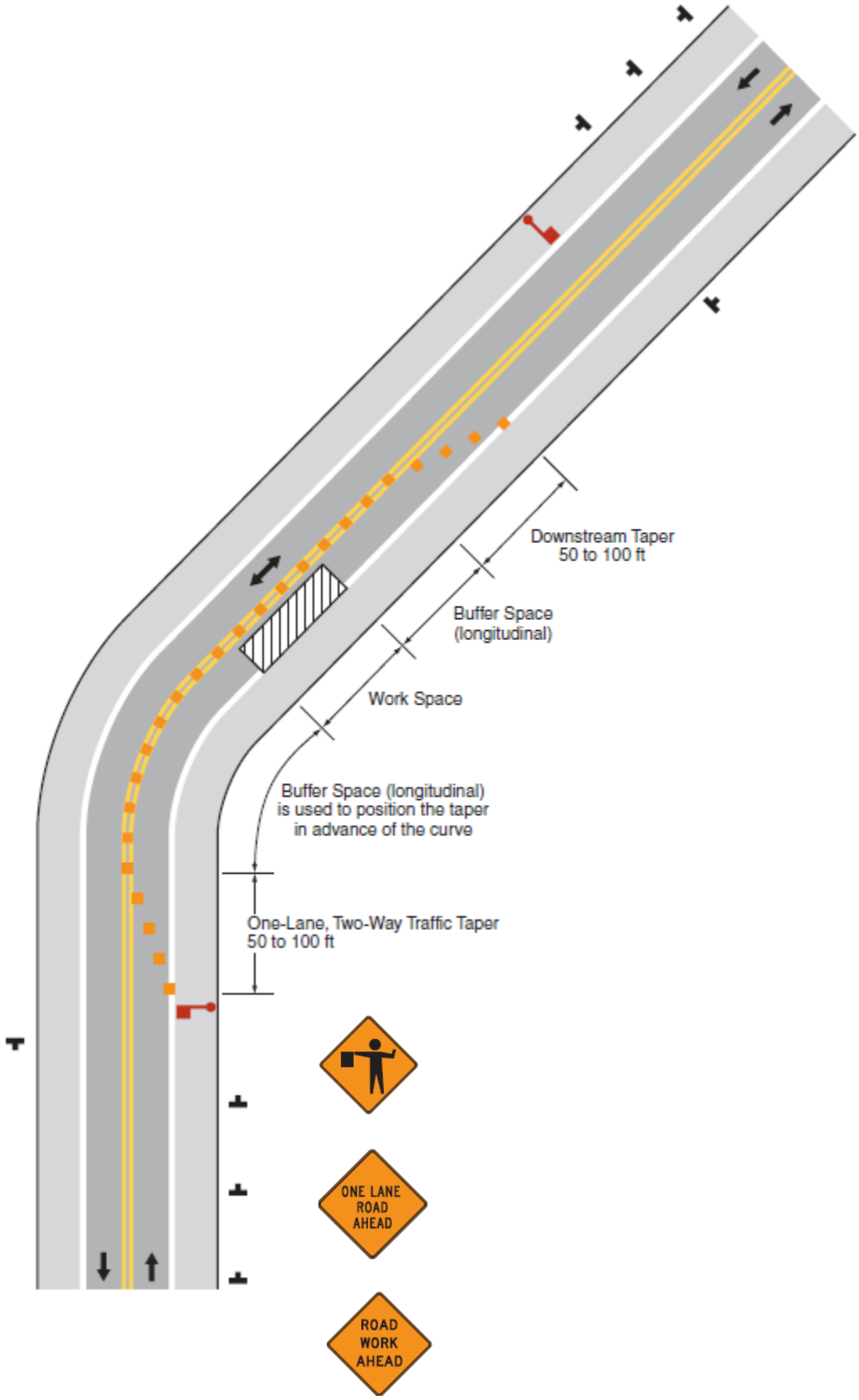


Figure 6C-3. Example of a One-Lane, Two-Way Traffic Taper



Lane Width	10-foot Shoulder		Suggested 5-foot Shoulder*	
MPH	Length*	Devices	Length	Devices
20	25	3	15	3
25	35	3	20	3
30	50	3	25	3
35	70	4	35	3
40	90	4	45	3
45	150	6	75	4
50	170	6	85	4
55	185	6	95	4
60	200	6	100	4
65	220	7	110	5
70	235	7	120	5
*L for shoulder taper equals Shoulder Width x Speed.			Speeds of <45 mph	

L	Taper length in feet	45 MPH or greater	L=WS
W	Width of lane being closed	40 MPH or slower	$L= WS^2/60$
S	Posted Speed-or off-peek 85th-percentile speed prior to work starting, or the anticipated operating speed in mph		
Merging Taper	Length "L"	Two-Way Taper	50 to 100 feet
Shifting Taper	Length "1/2 L"	Downstream Taper	50 to 100 feet
Shoulder Taper	Length "1/3 L"		

(Table 6C-4from the MUTCD is used to determine taper lengths.)

Speed (s)	Taper Length (L) in feet
40 mph or less	$\frac{WS^2}{L} = 60$
45 mph or more	$WS = L$
Where: L = taper length in feet W = width of offset in feet S = posted speed limit, or off peek 85th percentile speed prior to work starting, or the anticipated operating speed in mph.	

Flagger Taper Tips – *If the flaggers cannot see each other, then a radio, pilot car, or other effective means of directing traffic must be used. They might need an additional flagger to stand between them and operate as the lead flagger. When a one-lane, two-way TTC zone is short enough to allow a flagger to see from one end of the zone to the other, traffic may be controlled by either a single flagger or by a flagger at each end of the section.*

Lane Width	10 Feet				11 Feet				12 Feet			
MPH	Merging L		Shifting ½ L		Merging L		Shifting ½ L		Merging L		Shifting ½ L	
	Length	Devices	Length	Devices	Length	Devices	Length	Devices	Length	Devices	Length	Devices
20	70	5	35	3	75	5	40	3	80	5	40	3
25	105	6	55	4	115	7	60	4	125	7	65	4
30	150	8	75	5	165	9	85	5	180	10	90	5
35	205	8	105	5	225	9	115	5	245	9	125	5
40	270	10	135	6	295	11	150	6	320	12	160	6
45	450	16	225	9	495	18	250	9	540	19	270	10
50	500	14	250	8	550	15	275	8	600	16	300	9
55	550	15	275	8	605	16	305	9	660	18	330	9
60	600	16	300	9	660	18	330	9	720	19	360	10
65	650	17	325	9	715	19	370	10	780	21	390	11
70	700	19	350	10	770	20	385	11	840	22	420	12

***Guidance**:*

When a single flagger is used on low volume low speed, the flagger should be stationed on the shoulder opposite the construction or workspace, or in a position where good visibility and traffic control can be maintained at all times. When good visibility and traffic control cannot be maintained by one flagger station, traffic should be controlled by a flagger at each end of the section. Low volume are roads of less than 400 vehicles average daily traffic (MUTCD) and low speed is 40 MPH or less.

8.5 Activity Area

The activity area is the section of the highway where the work activity takes place. It is comprised of the workspace, the traffic space, and the buffer space. The workspace is the portion of highway closed to road users and set aside for workers, equipment, and material. Workspaces may be delineated for road users, or to exclude vehicles and pedestrians with temporary devices or barriers.

The workspace may be stationary or may move as work progresses. The buffer space is a lateral and/or longitudinal area which separates road user flow from the workspace or an unsafe area and might provide some recovery space for an errant vehicle.

Neither work activity nor storage of equipment, vehicles, or material should occur within a buffer space. The buffer space is an optional feature used to protect workers, equipment or road users. Good judgement will determine the length or width of the lateral buffer space needed.

Speed	20	25	30	35	40	45	50	55	60	65	70	75
Table 6E-2	115	155	200	250	305	360	425	495	570	645	730	820

8.6 Termination Area

This section is the area of the TTC where road users are returned to their normal path. The termination area extends from the downstream end of the work area to the last TTC device such as END ROAD WORK signs, if posted. If a construction site extends on periodically, it is good practice to have a termination sign.

8.7 Restricted Visibility

Road users need adequate time to respond. If a vehicle rounds a corner and is met by a line of cars, they might not have time to respond. Consider either having an advanced flagger or moving the flagging station before the corner or hill.

8.8 Radio Method of Communication

Communicating via radio is best when flaggers cannot see or have limited sight. When in use these devices are communications are to be related strictly to the business of ensuring a safe and well-functioning TTC zone. Use professional language. Radio communication is required for WSDOT projects.

8.9 Pilot Cars

Pilot cars are used to guide one-way traffic through a TTC zone, especially through long or confusing areas. Flaggers are still used to control road users and stay in communication with pilot car. A pilot car driver must be a certified flagger. The pilot car must be identified as a pilot vehicle and marked with company name and with PILOT CAR FOLLOW ME (G20-4). The TCP must include sufficient room for pilot car to turn around.

8.10 Automated Flagger Assist Device

Automated Flagger Assistance Devices (AFADs) enable the flagger(s) to be positioned out of the lane of traffic and are used to control road users through temporary traffic control zones. These devices are designed to be remotely operated either by a single flagger at one end of the TTC zone

or at a central location, or by separate flaggers near the location of each device. When used at night, the AFAD location shall be illuminated.

When the AFAD is not in use, the signs associated with the AFAD, both at the AFAD location and in advance, shall be removed or covered.

Since AFADs are not traffic control signals, they shall not be used as a substitute for or a replacement for a continuously operating temporary traffic control signal as described in section 6F.84 of the MUTCD.

8.11 Temporary Traffic Control Signals

Temporary traffic control signals are used to control road user movements through TTC zones and in other TTC situations. These signals are typically used in TTC zones such as temporary haul road crossings, long term one-lane, two-way traffic control and at intersections.

8.12 Stop or Yield Control Method of One-Lane, Two-Way Traffic Control

STOP or YIELD signs may be used to control traffic on low-volume roads at a one-lane, two-way TTC zone when drivers are able to see the other end of the one-lane, two-way operation and have sufficient visibility of approaching vehicles. If the STOP or YIELD sign is installed for only one direction, then the STOP or YIELD sign should face road users who are driving on the side of the roadway closed for the work activity area. A full sign set up is always required when flagger are used.

***Lighting Devices –** Lighting devices should be provided in TTC zones based on engineering judgment. When used to supplement channelization, the maximum spacing for warning lights should be identical to the channelizing device spacing requirements. Although vehicle hazard warning lights are permitted to be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights, they shall not be used instead of high-intensity rotating, flashing, oscillating, or strobe lights.*

***Floodlights –** Utility, maintenance, or construction activities on highways are frequently conducted during nighttime periods when vehicular traffic volumes are lower. When nighttime work is being performed, floodlights should be used to illuminate the work area, equipment crossings, and other areas. Floodlighting shall not produce a disabling glare condition for approaching road users, flaggers, or workers.*

***Warning Lights –** When warning lights are used, they shall be mounted on signs or channelizing devices per the manufacture's recommendations so if hit by an errant vehicle, they will not be likely to penetrate the windshield. The maximum spacing for warning lights should be identical to the channelizing device spacing requirements.*

The light weight and portability of warning lights are advantages which make these devices useful as supplements to the retro-reflectorizing tape on signs and channelizing devices. The flashing lights are effective in attracting road user attention. Warning lights may be used in either a steady-burn or flashing mode. Except for the sequential flashing warning lights, flashing warning

lights shall not be used for delineation as a series of flashers fails to identify the desired vehicle path. Warning lights shall have a minimum mounting height of 30 inches to the bottom of the lens.

***Type A (Low-Intensity Flashing)** warning lights are used to alert road users during nighttime hours they are approaching or proceeding in a potentially hazardous area. Type A warning lights may be mounted on channelizing devices.*

***Type B (High-Intensity Flashing)** warning lights are used to warn road users during both daylight and nighttime hours that they are approaching a potentially hazardous area. Type B warning lights are designed to operate 24 hours per day and may be mounted on advance warning signs or on independent supports.*

***Type C (Steady-Burn)** warning lights and **Type D (360-degree Steady-Burn)** warning lights may be used during nighttime hours to delineate the edge of the traveled way.*

***Arrow Boards –** An arrow board shall be a sign with a matrix of elements capable of either flashing or sequential displays. This sign shall provide additional warning and directional information to assist in merging and controlling road users through or around a TTC zone. An arrow board in the arrow or chevron mode should be used to advise approaching traffic of a lane closure along major multi-lane roadways in situations involving heavy traffic volumes, high speeds, limited sight distances, and under other conditions where road users are less likely to expect such lane closures. If used, an arrow board should be used in combination with appropriate signs, channelizing devices, or other TTC devices.*

An arrow board should be placed on the shoulder of the roadway or, if practical, farther from the traveled lane. It should be delineated with retroreflective TTC devices. When an arrow board is not being used, it should be removed; if not removed, it should be shielded; or if the previous two options are not feasible, it should be delineated with retroreflective TTC devices.

Arrow boards shall meet the minimum size, legibility distance, number of elements, and other specifications shown later in Figure 6F-6.

The minimum mounting height of an arrow board should be 7 feet. This distance is measured vertically from the bottom of the board to the roadway below, or to the elevation of the nearest edge of the roadway. An exception is made for vehicle-mounted arrow boards, which should be as high as practical.

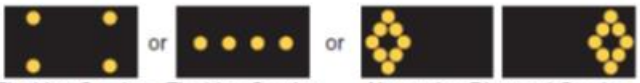
An arrow board shall have the following three mode selections:

a. *A Flashing Arrow, Sequential Arrow, or Sequential Chevron mode*
b. *A Flashing Double Arrow mode*
c. *A Flashing Caution or Alternating Diamond mode*

An arrow board in the arrow or chevron mode shall be used only for stationary or moving lane closures on multi-lane roadways. For shoulder work, blocking the shoulder, for roadside work near the shoulder, or for temporarily closing one lane on a two-lane, two-way roadway, an arrow board shall be used only in the caution mode. When arrow boards are used to close multiple lanes, a separate arrow board shall be used for each closed lane. Arrow boards are placed at the

beginning of the taper on the shoulder of the road. If there is not adequate shoulder room, it is placed as close to the beginning of the taper as possible in the taper.

Figure 6F-6. Advance Warning Arrow Board Display Specifications

Operating Mode	Display (Type C arrow board illustrated) (right arrow shown; left is similar)
1. At least one of the three following modes shall be provided:	
Flashing Arrow	 Merge Right
Sequential Arrow	 Merge Right
Sequential Chevron	 Merge Right
2. The following mode shall be provided: Flashing Double Arrow	 Merge Right or Left
3. At least one of the following modes shall be provided: Flashing Caution or Alternating Diamond Caution	 Flashing Caution or Flashing Caution or Alternating Diamond Caution

(Note: WSDOT allows the four-corner caution mode only.)

Arrow Board Type	Minimum Size	Minimum Legibility Distance	Minimum Number of Elements
A	48 x 24 inches	1/2 mile	12
B	60 x 30 inches	3/4 mile	13
C	96 x 48 inches	1 mile	15
D	None*	1/2 mile	12

*Length of arrow equals 48 inches, width of arrowhead equals 24 inches

8.13 Portable Changeable Message Signs

A portable changeable message sign (PCMS) is a TTC device which may be installed for temporary use with the flexibility to display a variety of messages. PCMS's are used most frequently on high-density urban freeways but have applications on all types of highways where highway alignment, road user routing problems, or other pertinent conditions require advance warning and information. ***Portable changeable message signs should be used as a supplement, never a substitute, to conventional signs and pavement markings.***

Portable changeable message signs have a wide variety of applications in TTC zones including: roadway lane or ramp closures, incident management, width restriction information, speed control or reduction, advisories on work scheduling, road user management and diversion, warning of adverse conditions or special events, and other operational control.

The purpose of a PCMS in TTC zones is to advise the road user of unexpected situations and is particularly useful as they are capable of:

- *Conveying complex messages,*
- *Displaying real time information about conditions ahead, and*
- *Providing information to assist road users in making decisions prior to the point where actions must be taken.*

Some typical applications include the following:

- *Where the speed of vehicular traffic is expected to drop substantially;*
- *Where significant queuing and delays are expected;*
- *Where adverse environmental conditions are present;*
- *Where there are changes in alignment or surface conditions;*
- *Where advance notice of ramp, lane, or roadway closures is needed;*
- *Where crash or incident management is needed; and/or*
- *Where changes in the road user pattern occur.*

8.14 PCMS Guidelines

The following information provides guidance for the use PCMS equipment:

- *Portable changeable message signs should be visible from 1/2 mile in both day and night conditions.*
- *Letter height used for portable changeable message sign messages should be a minimum of 18 inches.*
- *Messages on a portable changeable message sign should consist of no more than two phrases, and a phrase is limited to no more than three lines of text and eight characters per line.*
- *Each phase should be capable of being understood by itself, regardless of the order in which it is read.*
- *Messages should be centered within each line of legend.*

- *If more than one portable changeable message sign is simultaneously legible to road users, then only one of the signs should display a sequential message at any given time.*
- *The mounting of portable changeable message signs on a trailer, a large truck, or a service patrol truck shall be such that the bottom of the message sign shall be a minimum of 7 feet above the roadway in urban areas and 5 feet above the roadway in rural areas when it is in the operating mode.*
- *When portable changeable message signs are used in TTC zones, they should display only TTC messages.*
- *When portable changeable message signs are not being used to display TTC messages, they should be relocated such that they are outside of the clear zone or shielded behind a traffic barrier and turned away from traffic.*
- *Portable changeable message sign trailers should be delineated on a permanent basis by affixing retroreflective material*

PART E

SIGNALING AND FLAGGERS

WAC 296-155-305 Signaling and Flaggers.

Definition:

Flagger means a person who provides temporary traffic control.

For the purposes of this chapter, ***MUTCD*** means the Federal Highway Administration's Manual on Uniform Traffic Control as currently modified and adopted by the Washington State department of transportation.

Link: For the current version of the MUTCD, see the department of transportation's website at

https://www.wsdot.wa.gov/Operations/Traffic/mutcd.htm

1. General requirements for signaling and flaggers.
   a) Employers must first apply the requirements in this section. Then you must set up and use temporary traffic controls according to the guidelines and recommendations in Part VI of the MUTCD.
   b) Job site workers with specific traffic control responsibilities must be trained in traffic control techniques, device usage, and placement.

Note:

- You may purchase copies of the MUTCD by writing:

  US Government Printing Office
  Superintendent of Documents
  Mail Stop: SSOP
  Washington DC 20402-9328

- You may view and print a copy of the MUTCD at the following website

https://www.wsdot.wa.gov/Operations/Traffic/mutcd.htm

2. When to use flaggers.
   a) Flaggers are to be used only when other reasonable traffic control methods will not adequately control traffic in the work zone.
   b) If signs, signals, and barricades do not provide necessary protection from traffic at work zones and construction sites on or adjacent to a highway or street, then you must use flaggers or other appropriate traffic controls.
3. Flagger signaling.
   a) Flagger signaling must be with sign paddles approved by WSDOT and conform to guidelines and recommendations of MUTCD.
   b) Sign paddles must comply with the requirements of the MUTCD.

c) When flagging is done during periods of darkness, sign paddles must be retroreflective or illuminated in the same manner as signs.

d) During emergency situations, red flags, meeting the specifications of the MUTCD, may be used to draw a driver's attention to particularly hazardous conditions. In nonemergency situations, a red flag may be held in the flagger's free hand to supplement the use of a sign paddle.

4. Adequate warning of approaching vehicles. Employers must:

- Position work zone flaggers so they are not exposed to traffic or equipment approaching them from behind.
  - If this is not possible, then the employer, responsible contractor, and/or project owner must develop and use a method to ensure that flaggers have adequate visual warning of traffic and equipment approaching from behind.

Note:

- The following are some optional examples of methods that may be used to adequately warn or protect flaggers:
  - Mount a mirror on the flagger's hard hat.
  - Use an observer.
  - Use "jersey" barriers.
- The department recognizes the importance of adequately trained flaggers and supports industry efforts to improve the quality of flagger training. However, training alone is not sufficient to comply with the statutory requirement of revising flagger safety standards to improve options available that ensure flagger safety and that flaggers have adequate visual warning of objects approaching from behind them.

5. High-visibility garments for flaggers.

a) While flagging during daylight hours, a flagger must at least wear, as an outer garment:

- A high-visibility safety garment designed according to Class 2 specifications in ANSI/ISEA 107-1999, American National Standard for High-Visibility Safety Apparel.
  - Consisting of at least 775 square inches of background material that are fluorescent yellow-green, fluorescent orange-red or fluorescent red in color;

    AND

  - 201 square inches of retroreflective material that encircles the torso and is placed to provide 360 degrees visibility around the flagger.
- A high visibility hard hat that is white, yellow, yellow-green, orange or red in color.

Note: A high-visibility garment meets Class 2 specifications if the garment:

- Meets the requirements above;

OR

- Has an ANSI "Class 2" label.

Definition:

For the purpose of this rule, ***hours of darkness*** means one-half hour before sunset to one-half hour after sunrise.

b) While flagging during hours of darkness, a flagger must at least wear, as an outer garment:
   - A high-visibility safety garment designed according to Class 2 specifications in ANSI/ISEA 107-1999.
     - Consisting of at least 775 square inches of background material that are fluorescent yellow-green, fluorescent orange-red or fluorescent red in color;

       AND

     - 201 square inches of retroreflective material that encircles the torso and is placed to provide 360 degrees visibility around the flagger.
   - White coveralls, or other coveralls or trousers that have retroreflective banding on the legs designed according to ANSI/ISEA 107-1999 standards.
   - When snow or fog limit visibility, pants, coveralls, or rain gear, meeting these additional requirements must be worn:
     - In a highly visible color;
     - With retroreflective banding on the legs;
     - Designed according to ANSI/ISEA 107-1999.
   - A high-visibility hard hat:
     - Marked with at least 12 square inches of retroreflective material applied to provide 360 degrees of visibility.

Note: ANSI/ISEA 107-1999 is available by:

- Purchasing copies of ANSI/ISEA 107-1999 by writing:
  - American National Standards Institute

    11 West 42nd Street

    New York, NY 10036

    OR

  - Contacting the ANSI website at http://web.ansi.org/.

    OR

- Reading a copy of ANSI/ISEA 107-1999 at any Washington state library.

6. Flagger training. Employers must make sure that:

a) Each flagger has in their possession:
- A valid Washington traffic control flagger card; or
- A valid flagger card from a state such as:

– Oregon, Idaho, Montana;

OR

– Other states having a flagger training reciprocity agreement with Washington.

b) The flagger card shows the following:
- Verification that the flagger training required is completed;
- Date the flagger received their flagger training;
- Name of the instructor providing the flagger training;
- Name of the state that issued the flagger card;
- The card's expiration date, not to exceed three years from the date of issuance;

AND

- The flagger's picture or a statement that says “valid with photo ID.”

c) Flagger training is based upon the MUTCD.

Exemption: Personnel that have not completed a flagger-training course may be assigned duties as flaggers only during emergencies. Emergency assignments are temporary and last only until a certified flagger can be put into the position.

Definition:

For the purpose of this rule, ***emergency*** means an unforeseen occurrence endangering life, limb, or property.

7. Flagger orientation and traffic control plan.

a) The employer, responsible contractor or project owner must conduct an orientation that familiarizes the flagger with the job site. This requirement applies each time the flagger is assigned to a new project or when job site conditions change significantly.

The orientation must include, but is not limited to:

- The flagger's role and location on the job site;
- Motor vehicle and equipment in operation at the site;
- Job site traffic patterns;
- Communications and signals to be used between flaggers and equipment operators;
- On-foot escape route;

AND

- Other hazards specific to the job site.

b) If flaggers are used on a job that will last more than one day, then the employer, responsible contractor and/or project owner must keep on-site, a current site-specific traffic control plan. The purpose of this plan is to help move traffic through or around the construction zone in a way that protects the safety of the traveling public, pedestrians and workers.

The plan must include, but is not limited to, the following items when they are appropriate:

- Sign use and placement;
- Application and removal of pavement markings;
- Construction;
- Scheduling;
- Methods and devices for delineation and channelization;
- Placement and maintenance of devices;
- Placement of flaggers;
- Roadway lighting;
- Traffic regulations;

AND

- Surveillance and inspection.

8. Advance warning signs.

a) Employers must provide the following on all flagging operations:
   - A three-sign advance warning sequence on all roadways with a speed limit below 45 mph.
   - A four-sign advance warning sequence on all roadways with a 45 mph or higher speed limit.

b) Warning signs must reflect the actual condition of the work zone. When not in use, warning signs must either be taken down or covered.

c) Employers must make sure to follow Table 1 for spacing of advance warning sign placement.

(c) Employers must make sure to follow Table 1 for spacing of advance warning sign placement. **Table 1. Advanced Warning Sign Spacing**

Road Type	**Speed**	**Distances Between Advance Warning Signs.***			
A.**	B.**	C.**	D.**		
Freeways & Expressways 55	70	1,500 ft..+/- or per the MUTCD.	1,500 ft..+/- or per the MUTCD.	1,500 ft..+/- or per the MUTCD.	1,500 ft..+/- or per the MUTCD.
Rural Highways 60	65	800 ft..+/-	800 ft..+/-	800 ft..+/-	800 ft..+/-
Rural Roads 45	55	500 ft..+/-	500 ft..+/-	500 ft..+/-	500 ft..+/-
Rural Roads and Urban Arterials 35	40	350 ft..+/-	350 ft..+/-	350 ft..+/-	N/A
Rural Roads, Urban Streets, Residential Business Districts 25	30	200 ft.***	200 ft.***	200 ft.***	N/A
Urban Streets or less	25	100 ft.***	100 ft.***	100 ft.***	N/A

* *All spacing may be adjusted to accommodate interchange ramps, at-grade intersections, and driveways.*

** *This refers to the distance between advance warning signs. See Figure 1, Typical Lane Closure on Two-Lane Road. This situation is typical for roadways with speed limits less than 45 mph.*

*** *This spacing may be reduced in urban areas to fit roadway conditions.*

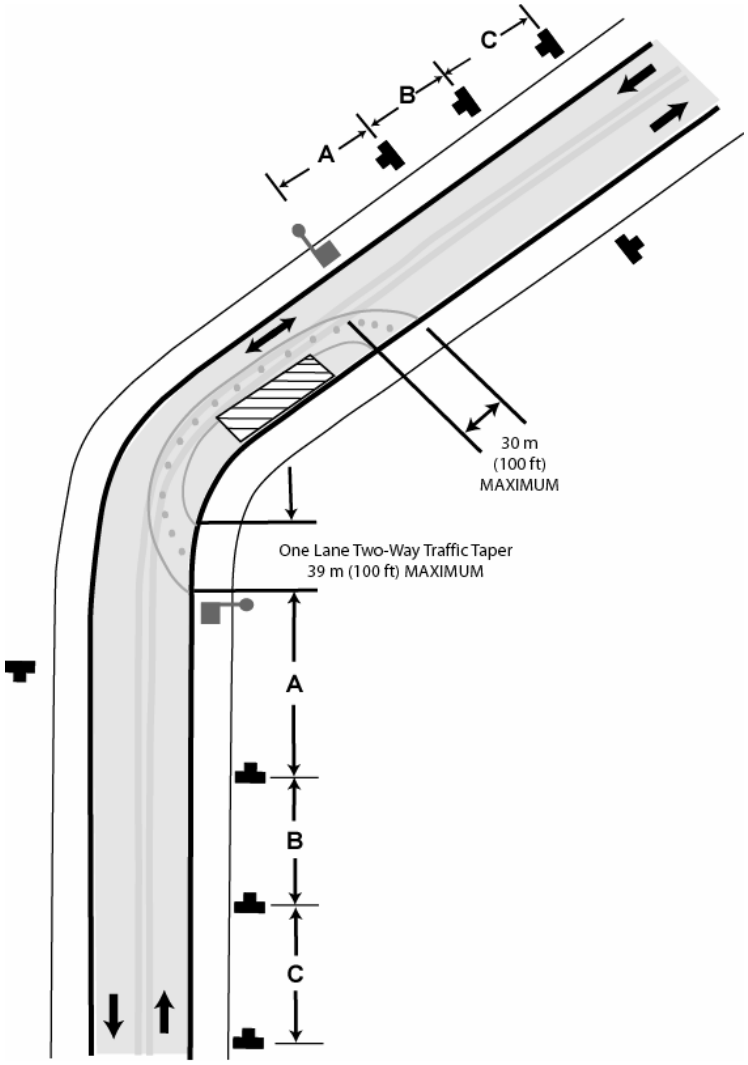
Exemption: *In a mobile flagging operation, as defined by the MUTCD when the flagger is moving with the operation, the "flagger ahead (symbol or text)" sign must be:*

- *Within 1,500 feet of the flagger;*
  AND

- *The flagger station must be seen from the sign.*

If terrain does not allow a motorist to see the flagger from the "flagger ahead" sign, the distance between the flagger and the sign must be shortened to allow visual contact, but in no case can the distance be less than the distance specified in Table 1, Advanced Warning Sign Spacing.

FIGURE 1



9. Providing a safe job site for flaggers. Employers, responsible contractors and/or project owners must make sure that:

   a) Flagger stations are located far enough in advance of the work space so that the approaching road users will have sufficient distance to stop before entering the work space. Follow Table 2 for the distance of the flagger workstation in advance of the workspace.

Table 2. Distance of Flagger Station in Advance of the Work Space	
Speed* (mph)	**Distance (ft)****
20	35
25	55
30	85
35	120
40	170
45	220
50	280
55	335
60	415
65	485

* Posted speed, off-peak 85th-percentile speed prior to work starting or the anticipated operating speed.

** This spacing may be reduced to fit roadway and worksite conditions. Distances greater than those listed in the table are acceptable.

b) Flaggers stand either on the shoulder adjacent to the road user being controlled or in the closed lane prior to stopping road users. A flagger must only stand in the lane being used by moving road users after road users have stopped.

Definition:

Road user means a vehicle operator, bicyclist, or pedestrian within a public roadway, including workers in temporary traffic control zones.

c) Flagger workstations are illuminated during hours of darkness by floodlights that do not create glare that poses a hazard for drivers.

Note: To identify potential glare, observe the lighted area from various directions and angles on the main roadway after initial floodlight setup.

Exemption: Emergency situations are exempt from these illumination requirements. For the purpose of this rule, emergency means an unforeseen occurrence endangering life, limb, or property.

d) Flaggers are not assigned other duties while engaged in flagging activities.

e) Flaggers do not use devices that may distract the flagger's vision, hearing, or attention.
   - Examples of these devices include cell phones, pagers, radios, and headphones.
   - Devices such as two-way radios used for communications between flaggers to direct traffic or ensure flagger safety are acceptable.

f) Flaggers receive a rest period of at least ten minutes, on the employer's time, for each four hours of working time.

- Rest periods must be scheduled as near as possible to the midpoint of the work period.
- A flagger must not be allowed to work more than three hours without a rest period.

Exemption: Scheduled rest periods are not required where the nature of the work allows a flagger to take intermittent rest periods equivalent to ten minutes for each four hours worked.

WAC 296-155-310 Barricades. Employers must make sure that barricades used for the protection of employees meet the requirements of Part VI of the MUTCD.

WAC 296-155-315 Definitions applicable to this part.

a) "Barricade" means an obstruction to deter the passage of persons or vehicles.
b) "Signs" are the warnings of hazard, temporarily or permanently affixed or placed, at locations where hazards exist.
c) "Signals" are moving signs, provided by workers, such as flaggers, or by devices, such as flashing lights, to warn of possible or existing hazards.